The Journal of the American Medical Association

Published under the Auspices of the Board of Trustees

VOL. XLIII. CHICAGO, ILLINOIS, DECEMBER 24, 1904. No. 26.

Addresses.

RELATIONS OF PATHOLOGY.*

LUDVIG HEKTOEN, M.D.

CHICAGO.

Ostwald, the inspiring interpreter of the great principles of science, states:

We have just passed through a period in which all sciences have been isolated, a period of specialization, and we find ourselves in an epoch in which the synthetic factors in science are gaining a constantly increasing significance. . . . Everywhere the individual sciences seek points of contact with one another; everywhere the investigator determines the value which his special results may have in the solving of the general problems. In short, all sciences are tending to be philosophical. Nowhere is this tendency toward fundamental explanation so great as in biology.

PATHOLOGY A DIVISION OF BIOLOGY.

Disease is the common lot of all forms of life—high as well as low, animal as well as vegetable—and it is the special province of pathology, the science of disease, to study life in its abnormal forms and activities. Hence pathology is a division of biology, and it is, in fact, pathologic biology, but its relationships as such have not always been so clearly appreciated as they ought to be; in part, this may be explained on account of the very special stress placed on its direct application to practical medicine in the service of the art of healing. For this and other reasons pathology in many respects has remained somewhat isolated among biologic sciences. The early pathologists took the almost exclusive standpoint of human medicine, and for a long time the vast resources of general biology remained practically unused in the study of disease. On the other hand, owing to lack of appreciation of the fact that disease is a phenomenon of life and to the unnatural separation of the biologic study of disease from general biology, the subject of disease has rather repelled the student of biology, who, therefore, seems to have neglected to utilize fully the approaches offered by pathology to a better knowledge of the phenomena of life.

In view of the extent to which man has busied himself with the study of all forms of animal life in all accessible parts of the world, is it not rather strange and an evidence of lack of co-ordination that the occurrence of cancer throughout the whole vertebrate kingdom should have been made out definitely only during the last year? Yet this demonstration by the Cancer Research Fund in London, as well as the further demonstration that cancer has the same fundamental characters as in man when it occurs in fish, reptile and bird, render it extremely improbable that either climate or diet of man has anything to do with the direct causation of cancer, thus putting an end to much needless speculation and materially narrowing the scope of a most important inquiry.

PATHOLOGIC PROCESSES IN EVOLUTION.

In some quarters disease has been regarded merely as an expression of inferiority and weakness, and as part, at least, of the means by which inexorable Nature carries out the verdict of extermination. Parasitism, for instance, has been designated as a weapon to eliminate those who fall below a certain standard. Consideration of the nature of disease from this point of view gives to disease merely a negative evolutional significance, as it would cause no new and better qualities in the descendency. Closer examination would tend to show, however, that processes of disease may have a different significance of a more positive nature in evolution. There are numerous simple as well as complex physiologic processes which, when set in motion by abnormal conditions, appear to be of advantage not only to the individual, but also to the species. As examples of adaptive processes, at first sight of more special individual advantage, may be mentioned regeneration, hypertrophy, the interesting adaptations to new and strange conditions of which bones and vessels are capable, certain phases of thrombosis, and even atrophy which has been described as the faculty of an organ to adapt itself to conditions of diminished nutrition, thus circumventing necrosis, a faculty of great advantage when the period of diminished food supply is only temporary.

No one can fail to see much that is useful and advantageous in the complex reactions to injuries observed in inflammations, the significance of which has been greatly broadened through the well-known comparative study of Metchnikoff. In the case of immunity, natural and acquired, our wonder knows no bounds, so marvellous are the precision and scope of the protective reactions, concerning which so much has been brought to light in recent years and which lend themselves well to comparative studies.

In the case of degenerations and tumors it is not possible to recognize any direct or indirect advantage, and certainly no one has yet been able to see malignant tumors in such favorable light.

In the instances first mentioned the pathologic reactions have physiologic prototypes; they are adaptations of physiologic processes. Regeneration and growth are taking place constantly in health. Phagocytosis, on which so much stress has been lain in inflammation, is merely an exaggeration of normal nutritive processes in certain cells. At present the production of antitoxins and other antibodies is best explained as the result of special adaptations of normal stereochem-

*Address in the Section of Pathology of the International Congress of Arts and Sciences, St. Louis, Sept. 22, 1904.

ical mechanisms whereby nutrition is carried on. A very noticeable difference between the physiologic and pathologic manifestations of these functions is seen in their imperfections and shortcomings under many of the abnormal conditions. Incomplete regeneration resulting in the formation of scars often has many disadvantages. Inflammations frequently establish conditions in themselves fraught with dangers. The reactions of immunity may not neutralize quickly enough the toxins nor destroy promptly enough the invading organisms. Hence there is abundant scope for the intervention of the physician armed with all the various appliances of his art, some of the most useful of which are the products of artificially produced biologic reactions.

But after all, those individual organisms must enjoy the best chances for survival and reproduction that suffer least harm because best able to adapt themselves and to protect the life and function of their cells under conditions of disease. Just as there are variations in the limits of physiologic regulatory mechanisms, so also there are individual differences of degree in the power of adaptive and protective reactions to establish themselves in disease and permit continuance of life. In progressive evolution it naturally must be in the descendants of individuals with the best adaptive and protective powers that an increasing completeness and perfection of such powers will be found.

Viewed in this light, many processes of disease assume a significance of positive character in biologic evolution, a point of view that would tend to increase the interest in pathology among the biologists in general, and thus further its development along broader lines and lead to co-ordination of knowledge and broad and still broader generalizations as to the causes, nature and processes of disease. At present we may be said to be gathering materials for this broader comparative pathologic biology of the future in the same way as older naturalists gathered materials for the biologists of the present day.

PATHOLOGY AND RESEARCH.

In certain fields, at least, the student of the pure science of disease is primarily interested in the knowledge of disease for its own sake without much thought or immediate care as to any prompt, practical use to which such additions as he may make to this knowledge may be put. It is true here, as it is in general, that most things are done only on account of the results expected from them in the future, but immediate technical utility is not always the sole guiding principle of the investigator in pathologic domains. The history of pathology shows him that in this science, as well as in its synthetic sciences, all actual increase in knowledge eventually helps to relieve suffering. Everywhere the most intimate relations may be seen between the progress of medical knowledge and the progress of medical art. Like other sciences, pathology furnishes many examples of the rather unexpected importance and the even profound influence of the new observation, the new methods of study, the new point of view that at first seemed to have but limited significance. Indeed, some of the fundamental ideas of scientific medicine have arisen in this way. It has been well said that no knowledge of substance or force of life is so remote or minute, but that to-morrow it may become an indispensable need (van Hise). We in America have, therefore, much reason to rejoice because of the strong movement that is starting in the interest of scholarship and of research in pathology, a movement that, of course, does not limit its influence merely to the advancement of knowledge, but exercises as well a powerful influence on the diffusion of knowledge. The man who is so full of enthusiasm for pathology that he will "burn his lamp for its advancement," is likely to be an inspiring teacher illuminating the older knowledge with the discovery of to-day and placing the new facts in their proper relations to what is already known and to what will be known. Medicine in this country has been so preoccupied with building up medical education for the training of physicians that comparatively little energy has been available for the upbuilding of medical science itself. Thus pathology in the universities has not been taught until very recently in such a way that graduate students might take it up as a branch to be followed through long stretches of labor. This is regrettable, but in some of our universities pathology is now placed on equal footing with other natural sciences and fully recognized as a proper field for work leading to higher degrees, and this is a much-desired progress in a most important direction. The direct interest now taken by many persons in medical research, the institutes and funds their munificence has established, are also having a most profound influence on the development of pathology in this country. Another mighty current in favor of this development has set in from the scientific work carried on in our various governmental and state institutions.

PATHOLOGY AND SYNTHETIC SCIENCES.

Let us now attempt to trace briefly the present relations of pathology to cognate sciences with the object of learning, if possible, in which direction the hope lies for greatest progress and to mark out the paths along which our investigators must journey in order to gather the best materials for that wider and larger pathologic biology on which we are still to work. The clearest conception of the rôle that the more important synthetic factors have had and are having on the development of pathology will be obtained through the historic perspective. In this way, too, it may prove feasible to show how some of the special problems have been solved and to bring into relief the great co-ordination of useful knowledge exemplified by practical medicine and the influence on it that various sciences have had and are having through the medium of pathology.

THE ANATOMIC IDEA IN MEDICINE.

Anatomy was the earliest biologic science to receive cultivation. The first laboratory for the training of students was the anatomic. One cause, at least for this, if not *the* cause, was the downright necessity for physicians to become closely acquainted with the structure as well as the functions of the human body. It is consequently not strange that pathology in the modern sense should begin as pathologic anatomy, that is, with the study of the grosser, evident alterations in structure that result from disease and on which, in turn, rest many of the disturbances of function observed in disease. In its earlier stages pathologic anatomy busied itself with the accumulation of a store of facts and observations gained almost wholly by the examination of human bodies after death. Morgagni was the first to attempt any generalization from this store of facts, and by correlating the anatomic changes observed after death with the disturbances of functions observed as clinical symptoms during life, he was able to draw conclusions of fundamental importance in regard to the seats and causes, at least in

certain phases, of disease. This is the first instance of synthesis on a large scale of two biologic sciences in the study of pathology, namely, the physiologic or study of function, and the anatomic or study of structure. Morgagni's conception of disease as inseparably connected with structural changes in the organs was designated happily by Virchow as the anatomic idea in medicine, and this idea, the greatest gift of anatomy to medicine, proved of incalculable service in turning the minds of physicians away from speculation to careful, objective study of disease during life, as well as after death. We catch an interesting glimpse of Morgagni's own point of view in the following quotation from his writings:

The various steps in progress ought not to be disregarded, for, in difficult research, we derive encouragement from the recollection that, although the exertions of an individual may not advance philosophy in any perceptible degree, yet, owing to the power of experiment and the successive influence of opinion the most obscure and apparently unsuccessful inquirer may prove the first or the connecting link in a series of most valuable discoveries.

CELLULAR PATHOLOGY.

The next advance was the result of Bichat's introduction of minute anatomy and the demonstration that the organs consist of tissues to which the seat of disease now was referred. Before long came the epochal development in botany, under the influence of Schleiden of the cell doctrine, which was applied by Schwann to normal animal histology, and by Virchow in 1858 to pathology, the direct outgrowth being the justly celebrated cellular pathology, beginning an area during which medicine has made greater progress than in all preceding time.

Physiologic and pathologic processes were traced to the elementary morphologic constituents of living organisms—the cells. The famous phrase of 1855, *"omnis cellula e cellula,"* completed the liberation of medicine from abstract speculation already begun by Morgagni and greatly furthered by John Hunter, Bright, Addison and others in England, and by Laennec, Louis and others in France. "The physician grew from a schoolman into a scientific observer, and the surgeon who appeared on the scene in livery and without learning grew from a handicraftsman to be a man of science." Pathology became a natural science. What rich new fields were not open for investigation! A vast amount of material was accumulated from careful clinical and morphologic study of individual cases, and the basis thus laid for the construction of general laws and fruitful theories of disease. During the earlier part of this period attention was confined largely to man, but it also was often turned in the direction of animals in the effort to penetrate deeper into morbid processes; the experimental method was used to interpret correctly observations made in the clinic and in the postmortem room.

Of fundamental importance for all branches of medicine was the resulting organization of the teaching and investigation of pathologic anatomy. Following the leadership of Virchow in Berlin pathologico-anatomic institutes or laboratories were rapidly established and soon recognized as indispensably necessary for teaching, for research, and for direct assistance to medical practice. In the further course of development these laboratories have undergone various modifications and enlargements of scope, principally as the result of the advent of medical microbiology.

With surgery and the rapidly developing surgical specialties, pathologic anatomy—gross and microscopic—soon assumed permanent relations of fundamental character. The anatomic study of the diseases in question was followed by great progress in treatment, and the exponents of these branches of applied medicine did not remain merely receptive of the work of others, but have themselves prosecuted diligently pathologic investigations of great value. Indeed, in certain special branches, especially ophthalmology, otology and dermatology, the clinicians have long been practically the sole occupants of the fields of pathologic anatomy of their respective parts of the body.

The close study of pathologic anatomy, being largely the study of the results of disease, stimulated also to brilliantly accurate diagnosis of certain internal diseases, which, unfortunately, in some cases, was coupled with a disheartening therapeutic pessimism. Said the therapeutic nihilist Skoda: "We can diagnose disease, describe it and get a grasp of it, but we dare not by any means expect to cure it." That some of the followers of cellular pathology in the narrower, dogmatic sense, believed that the innermost secrets of disease could be reached by morphologic methods, and that functional disturbances always could be adequately explained by morphologic means, may now be regarded as an instance of the tendency man frequently shows to approach his problems from the least accessible points. These unfavorable tendencies in pathology led to the following protest by Clark in 1884:

We are so much concerned with anatomic changes; we have given so much time to their evolutions, differentiations and relations; we are so much dominated by the idea that in dealing with them we are dealing with disease itself that we have overlooked the fundamental truth that these anatomic changes are but secondary and sometimes the least important expressions or manifestations of states which underlie them. It is to these dynamic states that our thoughts and energies should be turned; they precede, underlie and originate structural changes; they determine their character, course and issues; in them is the secret of disease, and if our control of it is ever to become greater and better, it is on them that our experiments must be made.

Fortunately, Clark's warning had been anticipated by development. Virchow himself long before repeatedly emphasized that pathologic anatomy can not deal forever with the product without searching for the cause that led to its production. It seems to me that the following highly remarkable statement in the prospectus of the first volume of *Virchow's Archiv*, published in 1847, shows that the founder of cellular pathology had a wonderfully clear vision of the rôle pathologic anatomy was to play in the evolution of pathologic biology:

The standpoint we aim to occupy is simply that of natural science. Practical medicine the applied theoretical, the theoretical pathologic physiology is the ideal we shall strive to reach so far as our powers permit. While we recognize fully the title and the independence of pathological anatomy and of the clinic, they serve us pre-eminently as sources of new questions, the answers to which fall to the lot of pathologic physiology. Inasmuch, however, as these questions, to a large extent, may be formulated only through painstaking and comprehensive detailed study of manifestations (of disease) in the living, and of the conditions in the dead, we regard the exact growth of anatomic and clinical experiences as the first and most important demand of the present time. From an empiricism of this kind will result gradually the true theory of medicine, pathologic physiology!

MICROBIOLOGY, ETIOLOGY, COMPARATIVE PATHOLOGY.

It was reserved for etiology, the offspring of microbiology, "to lift pathology permanently out of the level

of a purely descriptive science, for, with the entrance of a dynamic factor, a causal element, under the guise of micro-organisms, the experimental era began definitely."

The coming of microbiology, long foreshadowed by ingenious speculations concerning infectious diseases, at once made pathology broader and definitely comparative in its scope, thus widening its relations to general biology on the one hand, and to preventive and curative medicine on the other. It will be recalled that the founders of bacteriology—Pasteur, chemist and biologist, and Koch, physician—both made their appearance in medicine as investigators of animal infections. Infectious diseases constitute a predominant part in the field of pathology, and deeper insight into their nature required simple, easily controllable conditions accessible to experiment and analysis. This became possible by the discovery and study of micro-organisms which could be used to set in motion the complex phenomena of disease according to the pleasure of the investigator. In animals the course of a disease may be cut short at any time for the purpose of investigation and better insight obtained into the evolutions of morbid processes. The disease may be studied in all its phases. Hence comparative pathology rapidly became the refuge of the investigator finding his way blocked by the necessary restrictions governing the study of human disease. The great influence of the comparative method of study of infectious diseases is well shown in the relatively advanced state of our knowledge in regard to those human diseases of this class that are readily communicable to animals as compared with our ignorance in regard to the cause of certain other human diseases which, so far as we know, are not transferable to animals.

As the secrets of the vast domain of parasitism were revealed and the teachings of specific etiology and pathogenesis became appreciated, there sprang up in the place of the therapeutic hopelessness, inspired by the study of pathologic anatomy only, an increasing interest of enormous consequences in preventive measures. This was the natural outcome of the persistent efforts now made to follow the chain of causation so far as it was possible to go; for it early became established that the farther back of the immediate causes of diseases we can come, the more easily and economically are they controlled, and, reversely, the nearer we approach the period in the evolution of disease characterized by open manifestations the more difficult is disease to overcome. Hence the newer ideas of cleanliness and of surgical asepsis, sanitary science and preventive medicine—all are the offspring of the study of microbiology and etiology in a wide sense. Indeed, the great principle of prevention may be applied with perfect success, even when the actual cause of the disease remains unknown. The discovery by Walter Reed, for instance, that the cause of yellow fever is conveyed by a certain kind of mosquito, made it possible to prevent this destructive disease with absolute certainty, by destroying the mosquito.

INTERACTION OF PARASITE AND HOST. BIOCHEMISTRY AND IMMUNITY.

But the fundamental problems of etiology are not wholly solved by the discovery of the causative agent, however important this step may be: for it remains to explain how normal function and structure are upset by the entrance of this new factor.

Now the study of bacteriology and comparative pathology has permitted a deeper penetration into the nature and mechanism of certain infections. The discovery of bacterial and other toxins, complex soluble and diffusible chemical substances, and of their wonderful influence on the metabolism of cells, opened new and rich fields that under the hands of keen investigators have furnished precious materials for the advancement of medical science along new lines. Henle had anticipated many of our ideas of the interaction of parasite and host, but especially interesting are the teachings of Bretonneau in regard to the specificness of infectious processes, and the words of his pupil, the great Trousseau, have proved themselves of prophetic significance:

> There are (in infectious diseases) two factors; one is the morbific germ coming from without, and the other is the economy about to receive it; there is required a special aptitude for the organism to respond to the action of the stimulus . . . when there is no such predisposition the morbific germ perishes.

It was necessary to erect the great structure of cellular pathology and to make brilliant and epochal discoveries in morbific etiology before the suggestions in Trousseau's statement as to the interaction of host and parasite could be expressed in such definite terms and given such enlargement in scope as in the genial and heuristic side-chain theory of Ehrlich. According to this theory, a toxin is poisonous only when it unites chemically with some constituent in the cell of corresponding stereochemical configuration; if the cell does not contain this particular constituent the toxin is harmless; and when these constituents course in the blood as the result of reproductive processes in the cells they are protective (antitoxic), because they unite with the toxin and thus prevent the disastrous union of toxin with cells. In other words, the substance in the body which, when situated in the cells, is a primary essential for the toxic process, becomes a curative agent when it enters the blood stream (Behring).

Fortunately for the therapy and prevention of diphtheria, tetanus and a few other essentially toxic infections, these antitoxins may be caused to accumulate in large quantities in the blood of certain animals when artificially immunized by the injection of increasing doses of the corresponding toxin. It was a happy inspiration, indeed, that led Behring, Kitasato and Roux to use the antitoxic serum of immunized animals for curative and prophylactic purposes, thus turning to the common good this innate faculty of the animal organism to develop in so marvellous a manner its own resources.

Supported by numerous experiments among the most imaginative and interesting of modern biologic investigation, Ehrlich's theory has proven a veritable masterkey to some of the innermost secrets of toxic and antitoxic action and immunity in general. The theory has been found adaptable to other closely related problems in chemical biology, and its signal usefulness in promoting investigation in this complex field on broad comparative basis places it among the great theories of science.

Ehrlich's side-chain theory has been applied with great success to the explanation of the action and the formation by the cells of the various lytic or solvent substances for animal cells, particularly red corpuscles, as well as for bacteria. The active hemolysins, bacteriolysins and cytolysins are formed by the

union of two distinct bodies, amboceptor and complement, whose properties and affinities are being studied most actively. These substances occur to a considerable extent in the blood of normal animals, and may be induced to develop freely under the stimulation of the injection into animals of large quantities of the cells or bacteria to be acted on. The fact that hemolytic substances, though of a somewhat different and apparently less complex nature, are produced by certain pathogenic bacteria of common occurrence, especially streptococci, has given us a new point of departure for the study of the anemia that develops in streptococcal and other infections. By the aid of Ehrlich's theory it has also proved possible to explain the mode of action of the toxic substances in certain venoms, and in this particular field highly valuable facts have been established by the work of Flexner and Noguchi and of Kyes. In certain phases the subject has been beautifully simplified by the work of Kyes, who succeeded in showing that a definite chemical substance, namely, lecithin, may act as a complement to amboceptors in venoms, with which it unites as a crystallizable "lecithid."

The extraordinary complexity of the chemical substances produced by cellular activity is further illustrated by the group of substances known as agglutinins, which have the interesting property of drawing animal as well as bacterial cells together into clumps. Agglutinins may be produced by bacteria as well as by animals. It is more than likely that certain forms of thrombosis met with in infections are caused by agglutination of corpuscles, a form of thrombosis which has been designated as agglutinative. Experimentally, such thrombi are produced with ease by the injection of various agglutinating substances. In animals as well as in man certain infections, e. g., with typhoid bacillus, are associated with the development of agglutinins having a specific effect on the bacterium causing the infection. Such agglutinins are being used everywhere for two purposes: (*a*) To determine the nature of the infection for purposes of clinical diagnosis (as in the agglutination test for typhoid first introduced as a clinical measure by Grünbaum); and (*b*) to identify certain bacteria and establish their relations to the infection.

Furthermore, it has been found that the serum of an animal treated with a proteid form precipitates with that one proteid, a property that within certain limits appears to be specific. This has led to the use of specially prepared precipitating serums for the diagnosis of different proteids, e. g., the detection of human blood for medicolegal purposes, and for the study of the genetic relationships of certain animals—a study that in the hands of Nuttall has given results of general chemico-biologic interest from an evolutional point of view.

Reviewing these remarkable developments, one is profoundly impressed with the fact that at the same time as they constitute a most important widening out of biochemical science they have added greatly indeed to the permanent resources of practical medicine, emphasizing again in the clearest way the everlasting identity of the scientific and practical. Let no one, at least in the medical profession, ever doubt the practical value of the knowledge that ripens on the tree of science! These developments also demonstrate that there are other modes of progress toward knowledge of cellular activity and biologic mechanisms under pathologic as well as normal conditions than the purely morphologic highway, which hitherto had been followed with great persistence in pathology.

Here we are dealing with chemical substances and chemical and physical processes which ultimately will be interpreted in terms of chemistry and physics. Already Arrenhius and Madsen have attempted to show that the laws of mass action and chemical equilibrium govern the reactions between toxin and antitoxin, an attempt that has precipitated a sharp controversy with the Ehrlich school, which can not but powerfully stimulate continued work in this field. Recently we have learned, too, that many salts in ionizable solutions and also more complex substances combine in such a way with the complements in normal and immune serums as to hinder the union of complement and amboceptor necessary for lytic action. Perchance it is in this direction that we may look for some insight into the changes in physiologic mechanisms that permit various organisms to enter and set up disease.

It seems that in the chemistry of immunity we soon may expect most interesting developments. The fact that lecithin may act as complement, that it forms a crystallizable "lecithid" by union with the amboceptor of snake-venom; and, further, the evidence now at hand that colloidal silicic acid may play the part of amboceptor, warrant the hope that before long complete analysis and perhaps synthesis of lysins may become possible.

THE SYNTHESIS OF DIFFERENT METHODS IN SCIENTIFIC AND PRACTICAL MEDICINE.

In the majority of cases we owe our first knowledge of the existence of distinct diseases to clinical observation. By keen study physicians were able to distinguish even between more or less similar pictures, but the clinical picture has not always proved adequate for the determination of disease-entities. The clinical manifestations of certain diseases are so much alike that differentiation finally was accomplished as the result largely of the study of the more or less characteristic structural changes in the tissues of the body. In some cases differentiation could be made only after the discovery of the specific causative organism. This was the case with diphtheria. The clinical manifestations and the local anatomic changes in the throat caused by the bacillus of diphtheria may be reproduced in streptococcal and other infections. Now it is self-evident that the real penetration into the nature of a disease demands its complete separation from other, in certain respects, perhaps, more or less similar diseases. In the case of diphtheria, for instance, complete etiologic differentiation was essential in order that the real value of diphtheria antitoxin might be learned. It may be mentioned, too, that it required the discovery by Koch of the same bacillus in practically all forms of human tuberculosis before the doctrine of the dual nature of this disease, at one time advocated by Virchow on anatomic grounds, received its final overthrow.

In various local inflammatory diseases, such as pleuritis, pericarditis, peritonitis, meningitis, and in many so-called septic conditions, i. e., local infections with general intoxication, but with or without bacteriemia, the same clinical manifestations and anatomic changes may be produced by different organisms. The diseases being different etiologically are consequently also in all likelihood different chemically in spite of their clinical and anatomic similarities, and for these rea-

sons deeper penetration into their nature as well as progress in direct treatment will depend largely on study of the organisms concerned and the products of their activities. Clearly an essential step in this direction is the differentiation of the diseases on etiologic grounds. Other examples of analogous nature could easily be cited.

Now, practically every disease, the nature of which we in some degree understand, may be cited in illustration of the close synthesis of clinical observation (clinical pathologic physiology), pathologic morphology, etiology and microbiology, experimental and comparative methods, and especially more recently of chemistry, in the development of our knowledge of disease. To the fullest extent this is true of certain infectious diseases. Starting with normal physiology and anatomy these have become the principal methods by which material is accumulated for that pathologic physiology which Virchow put as the chief end of medical investigation. And it is along this road, too, that the medical student passes to reach membership in the medical profession; for here also "ontogeny repeats phylogeny." Finally, these are also the very methods of procedure employed by the real physician in solving the problems of diagnosis and so of treatment presented by the individual patient, no matter to what specialty the case may be referred in consequence of the great differentiation of medical art with which we are familiar.

Practical medicine is availing itself more and more of the methods of scientific medicine. The laboratory is entering into closer and closer relations with the clinic. For the purpose of facilitating investigations as well as treatment, it has been found advantageous to include various laboratories in the clinic, and the use of laboratory methods has extended to all departments of medical practice, where their field of usefulness is constantly enlarging. How these methods may be made most easily available for the practitioner has now become a problem of real urgency. Pathology is consequently a great force in the interests of integration as opposed to differentiation in medicine; for pathology gathers under her wings, like a scattered brood, all the specialties which, in their respective fields, are using the same methods of investigation.

Whatever the rôle of pure morphology in the investigations of fundamental biologic problems—and it does not seem likely that it will lose greatly in significance in this respect so long as biologists regard the peculiar complexus of physical conditions called structure as absolutely essential to life—it always will maintain relations of fundamental importance in medicine. Medical and surgical diagnosis rests to a large extent on the recognition of the nature and cause of gross changes in structure and their consequences on function. To the surgeon pathologic anatomy is a guide whose minutest direction he must obey. Exact clinical observation controlled so much as ever possible by anatomic examination will continue, as emphasized by Chr. Fenger, the mainstay of medical progress in every locality.

The value of microscopic anatomy in the study of diseases of the blood, in the differentiation of new growths and in inflammatory products needs only mention. Many of the methods of microbiology are essentially morphologic. The established classification of bacteria is based on morphology, and the studies of the relations of micro-organisms to the cells of the body—often a matter of great importance—requires morphologic methods.

I believe there is no room for the opinion one occasionally hears expressed to the effect that the value of the usual methods of morphology and microbiology in scientific pathologic investigation has been exhausted. Of course the field can not be said to be so large as at one time, but there are still problems enough demanding the use of these very methods, refinements and improvements in which are constantly increasing their usefulness. Unquestionably advances in our knowledge of functional localization and in the tracing of conduction paths in the central nervous system of man will continue to depend in the main on the careful study of anatomic lesions and the functional and structural consequences. Blastomycetic dermatitis and paratyphoid fever are brilliant examples of "new diseases" recently established as the result of purely morphologic and microbiologic methods of study in fields long diligently explored. In trypanosomiasis and piroplasmosis of man and of animals we have other examples of interesting diseases, for the recent knowledge of the existence of which, as etiologic entities, we are indebted chiefly to clinical observation and morphologic studies of the blood. These facts indicate that microbic etiology may yet be forced to yield up hitherto carefully guarded secrets to more or less familiar methods or new modifications thereof.

In pathology, purely morphologic methods have surely as great importance in establishing etiologic relationships and as a means of orientation in various forms of investigation as they have in unraveling the intricate connection between structure and function. Progress in the domains of microscopic pathological morphology and progress in normal morphology will always be mutually helpful because pathologic cellular changes —necrosis, necrobiosis, degenerations and proliferations —are probably largely identical with normal cytomorphosis, being abnormal only as to time and place. A recent morphologic observation of great interest is that by Bashford and Murray of a process of conjugation in cancer cells. These observers found in cancer cells nuclear changes similar to those by which sexual cells are prepared for fertilization, and also fusion of nuclei equivalent to the process of fertilization known as conjugation. This discovery (if confirmed) will help to turn the search for the causative factor in cancer directly to the very processes in the cells themselves, a direction indicated already by the facts that cancer always "breeds true," that it is transplantable only within the species in which it originates, and that it behaves as an independent organism.

Undoubtedly the newer methods of study of recent microchemic reactions in normal cytology will prove valuable also in pathologic cytology. Perchance this synthesis of morphologic and chemical methods in time may give us some insight into the normal relations and time sequence of chemical reactions in biologic processes, normal as well as abnormal.

It proved to be an auspicious day both for chemistry and medicine when Pasteur conceived his biologic theory of alcoholic fermentation. Ludwig's prophecy of forty years ago that chemic physiology would largely prove a study of catalytic reactions has come true, and the cell is now no longer considered as a simple structure, but rather as a most complicated machine, the working of which for the most part is dependent on enzymes. Into the finer details of the manner in which these mechanisms may be disturbed under abnormal conditions we as yet have hardly been permitted to

penetrate, but the extensive recent researches dealing with the nature and mode of action of ferments in divers physiologic activities have awakened a lively interest in fermentations in pathologic processes which augurs well for the future.

Among the many intracellular ferments those causing self-digestion or autolysis of cells are thought to play an active and essential rôle in the removal of dead material, such as dead cells, necrotic tissue in infarctions and inflammatory exudates. Some idea of the fermentative activities in autolysis may be obtained from its action in pneumonia. In a few days autolysis may so alter a mass of exudate weighing several hundred grams that it is readily removed from the lungs by absorption and expectoration.

The biochemic mechanisms of normal and pathologic pigment formation have now been shown to depend on the action of oxidative ferments.

Cohnheim's demonstration that two enzymes, one coming from the pancreas and the other from the muscles, are necessary for the oxidation of sugar, appears to be a long step toward putting the pathogenesis of diabetes in an entirely new light. While these and other oxidizing ferments are the products of cellular activity, it at once suggests itself that they need not be the products of the cells of the same body which is later to use them, and the idea has been expressed that they may be introduced as needed much as antitoxins now are introduced (Long).

The results of the work of Croft Hill and of Kastle and Loewenhardt on the reversibility of ferment action have been eagerly grasped by pathologists and made to throw new light on the problems of fat absorption and translocation. Indeed, the newer chemic methods of study are changing completely our older ideas about fatty changes in the cells, ideas that were based almost wholly on morphologic appearances. Great progress has been made also in other respects in recent years from the application of the methods of physiologic chemistry to pathologic problems, but I must refrain from going into further details. As a result, the field of pure chemistry as an aid to medical diagnosis is enlarging, not merely as regards various analytical procedures for the testing of fluids and other substances, but the newer methods of physical chemistry, such as testing the solution content by electrical conductivity and cryoscopy have also been found useful in order to obtain information of help in reaching a correct diagnosis or a better understanding of the nature of the functional disturbance.

As indicated in the foregoing we are now at the beginning of an era of the application of physicochemic methods to many problems in medicine, problems that at one time were regarded as approachable only by so-called biologic methods, and the number of problems that lend themselves promisingly to this form of treatment seems to be constantly increasing. I have referred already to their use in the study of chemic problems in immunity. The many fundamental problems connected with the constancy of osmotic pressure in the fluids of the body; the great influence of osmotic disturbances in the production of edema; the part played by inorganic salts in various phenomena and the interesting relations of ions to proteins; the physico-chemic properties of ions of various salts in relation to pharmacologic action—these are some of the questions that are being actively studied with results, in many cases, of far-reaching importance.

In many of its phases this departure is the outcome of the application by Loeb and others of general chemistry to biologic study, the results of which have been followed with increasing wonder as they have shown us the extent to which life phenomena can be controlled unequivocally by chemical and physical means. Many of the manifestations of life are physical in character, but biologists are agreed that the source of energy in life phenomena is chemical, and that general chemistry therefore must form the foundation of biology. From this it follows directly that the deeper, fundamental explanation of the mechanisms of pathologic processes also requires chemical and physical methods. Henceforth chemistry will play an increasingly important rôle in the efforts to reduce the phenomena of pathologic biology to simpler laws. We thus find that sharp lines of demarcation can not be drawn between normal and pathologic biology; for progress in one naturally exercises determining influence on progress in the other, and in both development is in the direction of closer synthesis with physics and chemistry.

Medicine has been called the mother of sciences, and not without reason. She gave to physics Galileo, Mayer, Helmholtz; to geology, Steno; to botany, Linnæus; to biology, Huxley; but as pointed out by Sir Michael Foster, her children are ever coming back to help her. In medicine as a science and as an art many sciences converge—physical, chemical and biologic methods join hands for the advancement of knowledge and the relief of suffering.[1]

THE RELATION OF THE PHYSICIAN TO SANITATION.

CHAIRMAN'S ADDRESS BEFORE THE SECTION ON HYGIENE AND SANITARY SCIENCE, AT THE FIFTY-FIFTH ANNUAL SESSION OF THE AMERICAN MEDICAL ASSOCIATION, AT ATLANTIC CITY, JUNE 7-10, 1904.

GARDNER T. SWARTS, M.D.
PROVIDENCE, R. I.

On the question of hygiene and sanitation much, if not all, of the practice of medicine rests. The nearer that the individual personally and the nearer the public or masses of individuals collectively live and conduct themselves in accordance with the conditions provided by Nature, so much less will be the need of med-

1. Of the various articles from which I have drawn freely in preparing this address I would mention the following especially:

Barker, L. F.: The Unveiling of the Cell, THE JOURNAL A. M. A., March 1, 1902.

Chiari, H.: Die Pathologisch Anatomie in 19 Jahrhundert und ihre Einfluss auf die Aüssere Medicin, Verh. d. Naturforschr. u. Aerzte., 1900, Allg. Theil.

Councilman, W. T.: The Relations of Pathology to Medicine, 1898.

Flexner, S.: An Aspect of Modern Pathology, Science, 1903.

Harbitz, Fr.: Hovedtraek af den Pathologiske Anatomis Udvikling, Norsk Magazin for Lagevidenskaben, 1900.

Loeb, J.: The Limitations of Biological Research, University of California Publications, Physiology, 1903, vol. i, pp. 33-37.

Long, J. H.: The Relations of Chemistry to Modern Medicine, Science, 1904, vol. xx, pp. 1-14.

Ostwald, W.: The Relations of Biology and the Neighboring Sciences, University of California Publications, Physiology, 1903, vol. i, pp. 11-31.

Salomonsen, C. J.: General Pathology as a University Subject, Festskrift ved Invielsen af Statens Serum Institut, Copenhagen, 1902.

Smith, Th.: Comparative Pathology; Its Relation to Biology and Medicine, Proc. Phil. Patholog. Soc., 1900, vol. iii, pp. 165-181.

Vestberg, A.: Om de Sjukliga Företeelsernas Biologiska Betydelse, Upsala Läkareförenigens Förhandlengar, 1903.

Virchow, R.: Morgagni und der Anatomische Gedanke, 1894.

Welch, W. H.: Biology and Medicine, The American Naturalist, 1897, vol. xxxi, 756-766.

ical interference. What asepsis is to the surgeon, perfect hygiene is to the medical practitioner. Unfortunately, however, under the stress of accomplishment of great results in every line of effort except that of health, Nature's pristine conditions are forgotten and abuse of all her natural laws follows.

In the effort of the ignorant mother to improve on the diet provided by Nature, she seeks to add to the infant's strength by feeding it with all sorts of indigestible foods. The woman of knowledge, striving for social eminence, forces on her infant a diet, scientific, perhaps, but precarious, and the child's start in life is made with the handicap of a weakened intestinal tract and softened bones, a system, which in the next few years, serves as a good nutrient pabulum for the growth of the numerous bacteria especially provided for the growing child.

As the child grows, lack of knowledge in quarantine precautions or false economy in municipal administration makes it possible for him to acquire the many communicable diseases.

Fortunately, the ancient superstition that it was desirable to have these diseases in childhood is passing, yet there are still medical men among the older members of the profession who, while they do not think it desirable to willfully expose a child to smallpox, believe that it is well to acquire measles, for the reason that a child is pretty sure to acquire it anyway, and if enjoyed in childhood the course of the disease will be milder than if undergone in adult life, forgetting that the sequelæ from an attack of measles frequently incapacitates the child from full power of sight or hearing.

With the great advance made in the construction of school buildings and with the medical inspection of schools, one peril is minimized, but the stress and the demand made on the nervous system of an over-full curriculum has nearly reached the maximum of tension. To be sure, the development of the race in American precocity supplies the schools with nervous systems which are active and which possess a tensile strength which is increasing with every generation. Yet to this there must be a limit for practical utility.

Through the next stage of life the adolescent lacks a full understanding of hygiene, which should be taught more exactly, frankly and honestly at this period. He is exposed, if installed in college or separated from home surroundings in order to earn a livelihood, to the danger of alcoholic excess; less often to excessive use of tobacco, but always to the venereal peril which is treated with concealment by layman and professional.

Through adult life continuous demand is made on the system to do more than it is equal to. Overfeeding, on the one hand, and shortened periods for eating to gain time for work on the other, allows the normal functions little opportunity to produce a perfect constitution. If the digestive tract is not abused the nervous system is overtaxed.

The pitfalls are many, and the average man and woman succeeds in finding some one of them and Nature and her instructions are forgotten.

It is evident that the journey is perilious and a puzzle to one who stakes his intent on cause and effect, and he involuntarily quotes the statement that if he were God and if he had the making of man he would have made good health catching instead of disease.

But these dangers exist. Many, if not all of them, are avoidable, and the spread of many may be controlled. The health officer is the one appointed to see that the means of prevention are applied. He does so in proportion as the knowledge of modern sanitation may be possessed by him, and to the extent that his superiors supply him with the power and the money to apply that knowledge.

For the purpose of obtaining the latest and most perfect knowledge of the laws of hygiene and sanitation, the American Public Health Association meets once a year. For a perfect understanding as to the best means of applying this knowledge in a practical way, the Conference of State and Provincial Boards of Health of North America meets once a year, and its membership is made up of the executive and active health officers of the states and provinces and the country of Mexico. By provision of Congress, an annual meeting is to be called by the surgeon general of the Public Health and Marine-Hospital Service with representatives of the health boards of the various states.

The power for good in this line of investigation and application of interstate sanitation and quarantine and in reference to health matters in the broadest sense is illimitable, and will probably serve the various states with much information and assistance, especially in the management of diseases transmissible from state to state, and which may be introduced into the United States from abroad.

The Bureau of the Public Health and Marine-Hospital Service has for its executive administration six divisions for working out different lines of work for national sanitation. These divisions are as follows:

Division of Marine Hospitals and Relief.
Division of Domestic Quarantine.
Division of Foreign and Insular Quarantine and Immigration.
Division of Sanitary Reports and Statistics.
Division of Personal Accounts.
Division of Scientific Research.
Miscellaneous Division.

We also have for our instruction in sanitation this section, termed the Section of Hygiene and Sanitary Science of the American Medical Association.

With the existence of these three other organizations the question may be properly asked, What need is there of such a section? Whatever has been left undone by these three can be considered by this section.

It must be remembered that the American Medical Association is composed of practitioners, physicians and surgeons, who are interested in their work, to be sure, but, while they have a certain amount of knowledge of hygiene and sanitation, yet when questioned or when they meet with conditions calling for an opinion in reference to sanitation, whether it be a question of quarantine or plumbing, it will be found that their knowledge does not extend beyond the ordinary knowledge of the laity.

The instruction in hygiene given in the various medical schools, with few exceptions, is notoriously poor and inadequate. The students shirk attendance on a subject which does not appeal to them and is not popular, and for which they are not shown that there is any practical demand. This is frequently apparent in the examination papers presented and answered at the several state board examinations. On these subjects the markings are extremely low, and the applicants confess that the course given at college was not very interesting.

Of the graduates appearing for state examination at the present time are many able practitioners who still entertain the belief that sewer gas is capable of producing the specific diseases of typhoid fever, scarlet fever and diphtheria, and that malaria is produced by

the miasm or a condensed humidity arising from marshes.

To be well posted on sanitary beliefs and facts, necessitates that the practitioner be alive to the published matter on these subjects in the voluminous medical journals of the day. Radium and its uses may be interesting and require much attention to meet the queries of a curious public, but if the physician neglects the various articles on the mosquito theory of the transmission of disease, the rôle which the common house fly may play in the spread of various communicable diseases, or the bacterial possibilities in a vast number of diseases, he will be tripped by the heels with short explanation by his patients who, at the present day, are kept well posted by the lay press; and, as stated in the beginning of this article, he will find that medicine rests one of its numerous feet on sanitation, for cause, effect and treatment, for treatment in many cases consists of prevention. One may ward off a chill in malaria with quinin, but can not prevent the return of the disease nor the spread to others unless the mosquito is excluded.

From the small attendance at the last meeting of this Section it would appear as if there was little need of its continuance. This has long been my opinion. The failure of the Section to attract can not be ascribed to the failure to present good subjects and able papers from prominent men, but the subject here, as in the medical schools, is considered too remote from the researches of the physician on his daily routine work.

Other sections present more topics of general interest, and the members can not be in two places at once, although at the sessions of the American Medical Association this desire is strong. The organization is so broad that it is hard to live up to it all. It is worse than the three-ring circus with its continual whirl of changes.

The interest in the subjects presented at this Section is to the general practitioner no stronger than the interest of the laity for the same subjects. The average business man will give more attention to an address on the practical subject of purification of a water supply by filtration than will the practitioner, yet he, the shepherd and guide of his patients, should be thoroughly posted in such practical matters which influence the health, not of his patients alone, but of every citizen in the city using the water supply.

The advance in our knowledge of the bacteria has permitted of a more perfect understanding of the means of transmission of communicable diseases. Unless the general practitioner follows the reports of the medical journals giving the results of experimental investigation on these lines, he will find his system of quarantine somewhat antiquated with the visit of the live health officer of the present day. The old practitioner, believing in contamination of atmosphere either in gaseous combination or a chemical one or in some injurious combination, fears all air which may be in and even about a house where diphtheria or scarlet fever exists.

When acting as medical inspector for communicable diseases, I have met with the following conditions: In the back entrance of a house I have found chlorid of lime exposed in a plate or saucer; hanging in the doorway of the room occupied by the patient, sheets saturated with carbolic acid; reaching the bedside, a quantity of raw onions in a receptacle under the bed; hanging on a cord around the neck of the patient, a bag of camphor. An undoubted wealth of foul odors generated, evidently, for the purpose of stifling the miasm and catching the vicious microbe in his winged flight, even to the lower stairway and out the back door.

If these attempts were for the purpose of deodorizing one might have respect for the effort, and yet this method of purification, unless its purpose and the limit of its effect is understood, is liable to lead the attendant into a false sense of security.

The results of the investigations of our expert bacteriologists have shown that the presence of the morbific material or specific organism in diphtheria does not reach much beyond three feet from the mouth of the patient. The center of infection is in the throat, and may be communicated only from that point, hence the mouth, and utensils and hands coming in contact with the mouth, is the limit of the infectious material. Of course, these utensils may be transported to other rooms, and if used without washing, may be a distinct point of infection.

Unless there is coughing or expulsive respiration, or in cases where the attendant is a careless person, the secretion of the throat be smeared on the clothing, the possibility of carrying the disease is remote.

If the practitioner would concentrate his quarantine on the center of infection instead of laying so much stress on the observation of unnecessary rules and the use of disinfectants in places where they can not possibly find any contagion to disinfect, his results would be more satisfactory.

Among the communicable diseases which have prevailed from time prehistoric, the physician is brought into contact with the venereal group. While gonorrhea and syphilis have been declining in severity for several generations, yet some of our colleagues can tell us of the ravages which these two diseases produce in the full light of civilization.

These diseases are preventable, yet they continue to thrive. It is the duty of health officers to check preventable diseases, but if they are not informed of the location of the disease it is impossible for them to check it.

The physician is continually cognizant of the location of these diseases and of the source from which they come. Some caution their patients as to the danger after the patient has already paid for his experience and knowledge. Why was he not warned before in some practical way?

The Conference of State and Provincial Boards of Health, at its meeting in Washington, adopted a form of letter, copies of which shall be furnished by boards of health to physicians.

It is hoped that the physician may be able to assist the health officers and the public by placing these few trite statements in the hands of their afflicted patients, and at least warn them against communicating their disease to others.

The physician will claim that he invariably cautions his patients concerning the means of transmitting these diseases, but in the embarrassment and excitement of the consultation it is doubtful if many patients remember much of what has been said to them. In the immediate danger which is presented to their own person they are apt to disregard the far-reaching possibilities of the spread of the disease from themselves, or if they do know, on partial recovery, will lapse from their previous good intentions and become careless.

If a circular can be presented to them which they may preserve and read in the seclusion and quiet of

their own rooms, the impression of what and how will be more firmly fixed in their minds. The health officers are prepared to furnish the means, and it is now incumbent on the physician to do his share of the duty in giving warning.

There is one other matter wherein the physician often fails in his duty as a sanitarian. On physical examination of a patient it is determined without doubt that the person is suffering from pulmonary tuberculosis and is informed that "he has some trouble with his lungs," but the physician has not the moral courage to tell him that he has consumption. He may be sufficiently sordid to fear that the patient will consult some one else, and the second consultant will deny the presence of lung trouble for his own gain. Others may prefer to put off declaring the presence of any tuberculous affection, hoping, perhaps, for favorable results under treatment.

The patient, having no knowledge of the pressing need of care and attention to his ailment, does not again consult a physician until forced to do so by the advancement of the disease, and perhaps after a sufficient period to have become a menace to the public.

Herein lies one benefit to be derived from the examination of sputum by health boards. The physician, having explained the necessity of making an examination of the sputum to determine the presence or absence of tubercle bacilli, is placed under obligation to report the result to the patient, for he will make inquiry as to the result. In many cases it may be the only object of the patient in returning to the physician. Feeling comparatively well they do not feel that they need treatment, but curiosity stimulates them to ascertain the result of the examination.

Having determined positively the presence of tuberculosis, the intelligent physician at once emphasizes the necessity of care on the part of the patient not to allow any secretions from the mouth or lips to be transferred to other mouths or throats either by kissing, testing the baby's milk for warmth by drawing on the bottle nipple, allowing others to drink from the same glass, the use of towels in common with others, and the danger of promiscuous expectoration.

Boards of health making examinations of sputum for physicians present to the physician, with each positive report of the presence of the bacillus of tuberculosis, a circular setting forth in simple language the method of communication of the disease and the care required to prevent it. The departments, in a note to the physician, express the hope that it will be possible to place the circular in the hands of his patient, or at least with some member of the immediate family. How far this request is complied with can not be known to the department at the present time, inasmuch as the inspectors may not as yet interfere with the case by calling on the patient for any general information, and fearing that the increasing willingness of physicians to report their cases to the department may receive a check. Any visitation at this time without the consent of the attending physician causes him to conceal his cases, and thus much headway is lost in the difficult effort of health boards to obtain limited restriction of the spread of the disease.

The time will come, however, when the physician will see the desirability of co-operating with the health department in the control of this disease. The strong opposition to this is shown in the refusal of physicians to report their cases of consumption. It is claimed by some that there is nothing to be gained by if. Let the cases be reported and let the health department determine what value there may be in such a procedure. As a rule, health boards are not arbitrary in their administration. When they are seemingly so, the public and the majority of the profession agree with them. It is usually an individual who is offended. He does not believe in compulsory vaccination for school attendance. He does not see the need of quarantining a child recovering from diphtheria, prohibiting attendance from school, when, in his opinion, the child is physically well. He may believe in the Klebs-Loeffler bacillus as a causative factor in this disease, but he fails to see the possible connection between a patient who is able to be about and any other susceptible throat which may come in contact with the first case.

The physician can not understand why a patient shall object to use quinin for malaria when a majority of physicians have determined its value; yet he in turn fails to see that the health departments have had a long and varied experience with the methods of control of disease, have met more than his one individual case, and should have a better average knowledge of what to do.

If physicians would willingly report their cases of tuberculosis and designate in what particular cases the health boards could be of service in assuming the responsibility of instructing the ignorant classes, much could be done by judicious inspection, repeated from time to time, and by giving special directions how nutritious food may be prepared and the maximum of ventilation obtained under the most adverse circumstances.

The experiences of New York City, the pioneer in this movement, have shown what may be done as a beginning. Much has been accomplished, even in the face of fierce and continued opposition coming from medical societies.

It was not so many years ago that the profession opposed the compulsory reporting of scarlet fever, diphtheiria and typhoid fever, yet the boards have shown, by persistent effort, the need of such reports, and also that they are disposed to act only in accordance with generally accepted views and knowledge of the methods of transmission.

Learning by constant experience, the various boards reduce the border of their cordon to within practical limits, placing as little unnecessary restraint on the quarantine as is found from experience to be safe. This varies with the period of experience in the observation of certain states and towns. The character of the population, the reliability of the medical profession and the character and severity of diseases vary with each locality.

Where it might be necessary and desirable to place a cordon of police about a limited district in the presence of smallpox, yet by experience it has been shown that in different localities, even in the same state, a perfunctory quarantine is all that is required, and that in some instances mild measures of restraint, even with the ignorant class, may serve the end better than by creating unnecessary opposition, which it may be absolutely impracticable to compete with.

In some cities, in exercising quarantine in the presence of diphtheria, the bacteriologic and laboratory findings control the time limit of restraint or isolation. Other municipalities, which have adopted the requirements of a negative culture from the throat or from the throat and nose before raising quarantine, have discov-

ered the impracticability of enforcing this rule in the majority of cases.

Boards are exercising their best judgment and experience both in requiring a prolonged quarantine on the one hand, and a limited one on the other. The first may later find that a short period will fill all practical requirements.

The city of Providence, R. I., was, I believe, the first city after New York to introduce the culture method in the exercise of quarantine. The pendulum swung to the extreme of requirements, and after averaging the period of detention in all cases of diphtheria, a minimum period of ten days after disappearance of the membrane was all that was called for, a negative culture for release not being required after that time. While this seems to the rigid adherents of culture requirements as extremely lax, yet the results have not been so alarming as would naturally be predicted. The only objection to this rule that has appeared is that the physician and patient make just as much fuss over a detention of ten days as they do over one of fourteen or twenty, and perhaps the health officer might as well impose the longer period.

I cite these varied methods merely to impress on the practitioner that the health officers of the present day are working on reasonable grounds and as the result of experience, and that they are not endeavoring to demonstrate an autocratic control. They surely have enough other troubles in their routine work not to stimulate unnecessary opposition from their ally, the medical profession.

There is one other relation which the medical profession holds to good sanitation and in which they might be of invaluable assistance to the health authorities, but in which their neutrality remains a stumbling block. I refer to the attitude taken by the profession in regard to the general milk supply.

A physician imagines that he is very particular about his food supply, especially the water and milk. His worshipping clientele and the public also support his imagination in this regard. If Dr. Puritan is taking his supply from Farmer Littleclean, the inference is direct that the supply must be beyond reproach, and the various patrons of Farmer Littleclean are buoyed up by the repeated assertion that Dr. Puritan has taken milk of him for many years. No matter if the milk sours, on ice, within a few hours of delivery to the consumer, yet it must be the best to be obtained, for the physician, the adviser in sanitary matters, has the same supply.

Fortunately in this matter, some of the laity are thinking for themselves; the beshrined tin god who has been for generations worshiped on a pedestal is now admired on a level ground with his patient. The respect due to his necessarily assumed but undelivered knowledge in the past is now supplemented by a request for assistance on the grounds of common sense and reason. The people are instructed by the sanitarian and the public press, and the journals of health departments present facts and figures showing the quality or lack of quality of the foods ingested by the public and showing the death rates which accrue from the ingestion of these foods, especially that most common one, the lacteal fluid of the common cow.

Perhaps one of the most surprising conditions of indifference to sanitary affairs is shown in the attitude or lack of attention to the filthy condition of the public milk supply. A food which is utilized for all conditions of depressed states of the system, the only food of the infant, the selected nutrient in typhoid and other wasting fevers, this necessary adjunct to our life is accepted without question from whatever source the supply chances to come.

While in recent years specialists in children's diseases and certain men of adventure and independence have sought to encourage the production of milk, under sanitary conditions, yet the mass of physicians manifest no active interest in the encouragement of such a venture. In order to ascertain whether this statement had foundation, a few years ago I made inquiry of all physicians in good standing in my state concerning their knowledge of the general supply and their willingness to assist in a campaign for clean milk. Among the large number of answers received it was found that a small number were acquainted with the name of a dealer from whom they received their supply, and only a few knew the conditions under which the milk was collected and had visited the barns where the cattle were housed. Many knew that they were supplied with a good quality of milk because, forsooth, the farmer who supplied it was an honest person and had had a good reputation; he had been in business for a number of years, and while they were sure he would not water his milk, yet they were not quite sure that the jars in which the milk was delivered were free from sediment. In many cases it was admitted that the milk soured if kept over twenty-four hours, and sometimes it was found to be sour when delivered.

When asked if they would be willing to pay an advance of from one to two cents above the present price of milk, four or five were willing to do so, two or three of whom would discontinue this unnecessary expenditure as soon as the baby was old enough to take other food.

While the average physician is fully aware that the introduction of fermentative material strongly infected with bacteria of decomposition is hardly a proper food for an invalid, and that the feeding of cow-barn refuse, even to the healthy man, is hardly a sanitary measure, still they are not at all willing to assist the health officers in any genuine, active crusade to this end. Many states have required that the milk should have a certain standard of quality as regards fats and solids. Certain cities have made regulations requiring a license which shall be issued only to dealers who produce and collect their milk under prescribed sanitary conditions. Among these may be mentioned the city of Buffalo, and during the last month, in the city of Boston, regulations for the sale and care of milk require that the cows from which it is derived have, within one year, been examined by competent authorities and shown to be free from diseases dangerous to the public health. Milk shall not be stored in any building used for the stabling of animals, or for the storing of manure, or in any room used for domestic or sleeping purposes. All milk shall be strained, cooled or stored as soon as it is drawn from the cow. Milk kept for sale in any store shall be kept at a temperature not higher than 50 F., and shall be stored in a refrigerator which shall be kept tightly closed except when necessary to introduce or remove milk or ice. All utensils shall be cleansed or sterilized before being used again for the same purpose, nor shall any utensils be used to contain any other substance than milk. Every person engaged in handling the milk shall notify the board of health of the presence of any communicable disease with which he may be brought in

contact, and shall discontinue the sale of milk until authorized to resume the same by the board of health.

No milk or cream shall be sold which contains more than 500,000 bacteria to the cubic centimeter, and must be delivered at a temperature of not more than 50 F.

To the older practitioner and to the farmer these requirements seem to smack of cranky, scientific notions. To them it seems impracticable to accomplish these ends, and while they fully believe in their own minds that the dirty milk which they have supplied for years is good enough for any one, yet many of these men under this test will be found wanting.

The results of numerous tests have shown that the average bacterial efficiency may be quoted as follows: A certified milk produced and delivered under perfect sanitary conditions, working for asepsis under perfect cleanliness, should not contain over 10,000 bacteria to the cubic centimeter; many supplies contain less. The milk supplied from farms where the cattle are well fed and the stables kept fairly clean should not contain over 200,000, while the cheap milk found in stores will be found to contain 3,000,000 bacteria to the cubic centimeter. This variation is strong evidence that the hoped-for condition of a clean milk supply is within the bounds of possibility.

The farmers will make no effort to obtain this perfection so long as the respected medical profession is perfectly willing to purchase their goods. Health authorities will have difficult work in obtaining legislation to this end so long as the indifference of the profession continues. Medical societies may resolve and present their resolutions to the legislators, but so long as the physicians individually are willing to pay money for filth the farmer will continue in authority.

What can a health board do in the face of such parsimonious disinterestedness for the public weal? How can health boards appear before their legislators and ask for laws governing the production and distribution of milk, when the farmers in their filth are supported by the neutrality of the physician? If the physician is satisfied with a standard quota of cow dung with each delivery at his door, how much to his credit may be put on the balance of responsibility for the infant mortality rate?

Possibly the demand of sanitarians for clean milk, as well as for a standard of fats and solids, is too strenuous; perhaps their ideas are beyond the present age; perhaps they are not acting on experience. Surely those cities which have ordinances controlling the quality of milk delivered within their borders, have had experience, if their statistics of infantile mortality are reliable.

The physicians of the state of New Jersey are prepared to tell us whether a clean milk supply is a possibility, and whether it has any effect on the health of the people. There are physicians of the New Jersey type in some other states, but they are not sufficiently numerous to produce results and are handicapped by the mass of neutrals.

From vital statistics much data is obtained which assists the sanitarian in his work. If it may be ascertained which of the numerous diseases are the most common, his effort is at once to ascertain if this prevalence is dependent on any common condition, and if that condition is one amenable to change. This study finds its practical application in the suppression of communicable diseases. Many other diseases which are the cause of a large mortality may be found to be associated with conditions in common, some of which would hardly be suspected of being causative factors. Such conditions of climate, water and food supplies, subsoil saturation and the presence of insects and their breeding-places may also be found as associate conditions. Increased infantile mortality may find its association with a poor milk supply, a continued rise of atmospheric temperature or possibly an overabundance and interference of so-called midwives.

That these statistics, compiled from both mortality and birth returns, are of the greatest value, is admitted by several states, but one is surprised to find so few registration states in a country which is supposed to represent scientific advancement. Many large and prosperous states are entirely without any system of registration of births, marriages and deaths. Think of what a mass of useful material might be made available to the health officers of the state of Pennsylvania, and yet, except for registration in a few of the larger cities, no figures are available in that state.

Although sanitary authorities in non-registration states endeavor to obtain legislation to inaugurate a system of registration, yet there is little or no support from the medical profession. It is to be hoped that the Committee on Legislation of the American Medical Association will find it a part of their already active and earnest department to formulate a crusade to assist and stimulate the delinquent states in obtaining a thorough system of registration of births, marriages and deaths. This it can accomplish through the particular members of the medical profession whom they have learned from experience are the more active promulgators of new and advanced ideas in their respective districts.

In those states which have a working system of vital statistics, much improvement in methods and in accuracy of returns has been accomplished, but only by persistent work on the part of the state registrars.

It is admitted that imperfect statistics have little, if any, value, and may lead to unfortunate deductions. If the total number of either the deaths or the births is not obtained, the comparison of the two is useless. If only half of the persons dying are recorded as having died from certain diseases, the conclusions arrived at are deceiving. Vital and mortality statistics should rest on data known to be reliable and not computed on a rule of probability.

In states having perfected laws, provision is made that a return shall be made for each and every death, giving the cause of the death, yet it requires much diligence and harassing of undertakers and physicians to obtain complete and correct returns. In two states the law provides that the body of a deceased person may be disinterred on the order of the health department if the undertaker has failed to make a correct return of the cause of death before burial. Naturally but few disinterments have been required, inasmuch as one such case serves as a salutory restraint on a repetition of the offense.

A large number of causes submitted to the registrar as sufficient to produce death are of a character to make a thinking medical man smile, especially when it is the other fellow who signed the return. In some of his own returns he fails to find any humor whatever, and is perfectly willing to be placed on record as having attended a patient who came to his death by "cramps" or "spasms." If the return had been signed death by "colic," we might perhaps have circumscribed our area of possibilities and have eliminated epilepsy, puerperal

convulsions and the many acute diseases affecting the motor system. But with "colic" we have a fair chance to guess whether the case was one of appendicitis, peritonitis from septic infection or from violence, volvulus, impaction of feces, the passage of concretions from kidney or gall bladder, with possible rupture.

Of course, it is perfectly plain to him that the patient was jaundiced or that there was uric-acid calculi in the urine, but the last and most violent symptom was colic. In the case of an infant he ignores the gastroenteritis which caused the colic, or he has, perhaps, in this case signed the death return with convulsions as a cause. He will also forget that the intestinal indigestion causing the convulsions was the result of improper feeding. Hemorrhage alone is often given as a cause. The attending physician fails to give the source of the hemorrhage and the locality from which the blood came. The registrar is allowed to guess, or do as is done in all well-conducted offices of registration, politely addresses a note to a physician who is bankrupt as to diagnosis, and an inquiry is made as to whether the hemorrhage followed a coughing spell, or had he been treating a case of typhoid fever for a week or two, or if the hemorrhage had followed a confinement and if so what abnormal conditions were present; was the person a "bleeder" or was there a pistol in the case, and, if the latter case, was the wound self-inflicted, and if so, whether accidentally or with intent. We might go on citing these absurdities: "Heart failure," which even the laity smile at by this time; "natural causes" (i. e., one of the hundreds possible); "inanition" in a person over 5 years of age and under 50, etc.

It is believed that all physicians are ready and willing to assist in making the returns perfect. Those conditions arise from the result of habit and inattention, and forgetting that the registrar was not a consultant in the case.

If physicians would indicate in plain words on the return that the cause of death was unknown, or could not be determined, it is at once known that an effort was made to obtain some information as to the symptoms preceding death, but to say that the person died of "natural causes" indicates that he has not made any endeavor to determine a cause. If the best possible diagnosis available is given and one of the symptoms present, they would receive praise and gratitude and some slight salvation here on earth, for the registrar will rise up and call him blessed.

The majority of physicians believe in sanitation, and are willing to uphold the sanitary authorities. The young men who are taking up the profession of medicine come to the health department like a refreshing breeze on a hot summer day. The contention and opposition to reform which has come from the older members of the profession is mostly because the latter have not lived up to the advance of the times and must needs cover their ignorance as of yore with evasions and with mystification all that is new, even if based on logical experience. Here and there among the profession are men familiar to us all who are in medicine for what they can make out of it, by hook or crook. It is the natural disposition of this class to take a stand against any constituted authority, partly because it is contrary to their precepts to act on anything which is based on honesty and partly because by setting up opposition they hope to pose before their clientele as men of stamina and authority. Fortunately, it frequently happens that these obstructionists receive their just reward by making and falling into pitfalls, but while they exist they prove a source of great annoyance to the officers who are endeavoring to do what is right by all.

This class is readily recognized by its attempts to conceal the presence of communicable diseases, either by suppressing comment or by submitting intentionally a false diagnosis for the purpose of favoring their patients. Unfortunately for them, in order to obtain the small advantage of seeming to comply with the desire of the patient to conceal the disease he must admit to the family that scarlet fever or diphtheria is actually present, and thus as the result of human nature, which can not possess an advantage over fellow-man without gloating over it, the secret is at once disclosed to the neighbors as a success, and the physician's integrity is at once at stake beyond the pale of that household, and for slight gain and with much loss to himself he has placed obstruction in the way of the health officer and endangered the public, not alone by possible carelessness in his self-imposed quarantine, but by setting an example to the large and ignorant immigrant class to go and do likewise. He is the one who will sign a death return as grip when tuberculosis was the cause, in order to conceal the fact from an insurance company.

It is this same man who, from arrogance alone, diagnoses smallpox as Cuban itch, chicken-pox or as a simple skin disease, until he becomes alarmed at the spread of the disease and his methods are discovered. He may never have seen a case of smallpox, yet trustingly declares his knowledge to be superior to the authorities. His disposition for opposition, his desire to appear different, independent and superior to any and all other practitioners, permits him to flaunt himself before the public and spread havoc with the gullible class. In his experiments for advancement when dealing with smallpox, his downfall is usually sufficiently severe to satisfy the spirit of justice in the mind of the health officer.

How far does the regular practitioner take part in the fight against such irregularities, how far does he help the health authorities in giving these men their rightful position before the public?

The natural result of years of training in ethical conduct toward our honest and respected brother practitioners, our meek and modest desire to hurt no one's feelings, leads us to extend the same considerate kindness to those who should receive no recognition in medicine. Here and there may be a man who has the courage of his convictions and jumps to the assistance of the health officer by placing these men in a proper light, but he is at once set down as a fighter, and obtains for his reward only notoriety or neglect from his brother practitioners, whom he is endeavoring to defend at his own expense.

This conservatism and desire to stand behind the screen and let matters work out their own salvation, or to avoid being found on one side or the other leads the majority of practitioners to avoid assertion of their individual rights as citizens and their advanced privilege as men of a profession, when any movement for the betterment of hygienic conditions appears before legislative councils. The sanitarians and the health authorities ask for forms of government which shall control the ignorant public in doing things which is for the betterment of their health. It may be a question of pollution of water supplies, the adulteration of foods, the controlling of trades from a sanitary viewpoint, but not a word is heard from the mass of the profession

who have at least the political influence of their individual vote in the election of a state or municipal representative. The average politician, with all his assumption and dignity of representation, has his weak point in the fear of a non-election, and he has, as a rule, some slight respect for the opinions of a profession which, maintaining its dignity, asks for something which is practical and honest. He may not be able in many cases where "graft" is involved to see the scientific advantages of legislative sanitation, yet he is not always able to resist a concerted movement of a profession which carries the dignity and integrity of the medical profession.

Most of the advance in medical and sanitary legislation has been the result of the persistent efforts of individuals, who for their pains have lost time, frequently reputation, with their fellow-practitioners, and are cited as cranks and individuals who are working for notoriety.

If members of the profession would assert their rights as citizens and demand scientific medical and sanitary legislation, they would come nearer to their duty. To be sure, they are willing to commend any effort to advance hygienic improvements, but they do not step out and give their support to the health officer seeking for the betterment of the public. They consider that he is employed for that purpose, and must accomplish everything by himself without the support of the profession. If he asks for assistance he may obtain it in the form of a petition signed by innumerable M.D.'s, but as all legislators know that a petition is always signed for convenience to get rid of the messenger carrying the petition, and that the petitioner is often willing to sign petitions for both sides of the question, a petition, no matter how large, is considered of little value. It is the personal presentation of views to the representative which is of value only, and it is the duty of every physician who is conscientiously interested in the advance of sanitation to personally assist any measure to that end.

In the organization of the American Medical Association this idea is coming strongly to the front, as may be seen in the vigorous manner in which the legislative committee of the organization has pressed the needs of legislation in certain lines.

As is to be expected, since much of medicine rests on hygiene and sanitation, this committee finds its work to be in the line of the improvement of laws governing the adulteration of foods, and the desirability of sanitary authorities having undisputed authority in the prosecution of the work of the Panama Canal. The numerical strength of this body should serve as a factor in influ-ommendations made for the benefit of their constituents.

Much more evidence could be shown wherein the physician is closely in relation to the health officer and his daily works. It is evident that the more perfect the contact of the two and the greater the harmony that exists, the greater is the perfection in sanitary administration, and that all results in hygiene must rest on the perfection of the work by the man engaged in the practice of medicine.

Unprofitable Discussions.—Let every physician refuse to accept samples of secret medicines, refuse to waste time talking therapeutics with smooth-tongued salesmen. . . . The stereotyped reply, to all agents of secret nostrums, that I do not prescribe medicines of whose composition I am kept in ignorance, has saved me many hours for more advantageous professional work than conversation with men whom I despise.—Roberts, in *N. Y. Med. Jour.*

Original Articles.

A SUMMER'S EXPERIENCE WITH INFANTILE DYSENTERY.

J. H. MASON KNOX, JR., PH.D., M.D.

Physician in Charge of the Thomas Wilson Sanitarium; Assistant in Pediatrics, The Johns Hopkins University.

BALTIMORE.

(Concluded from Page 1854.)

TREATMENT.

The treatment of these cases at the sanitarium followed in the main the usually accepted lines and will not be here detailed.

In all acute cases milk was stopped for varying periods, and boiled water, with or without egg albumin, dextrinized cereal waters or broths, and later whey, were substituted. Gastric lavage was resorted to occasionally, but in nearly all instances the colon was repeatedly irrigated. On admission the intestinal tract was usually emptied by calomel or castor oil. Of the several intestinal astringents which were tried none proved more satisfactory than bismuth subnitrate in large doses. As stimulants, whisky or brandy, strychnia, digitalin and atropin were found useful in the order named. Opium was sparingly employed.

Serum Treatment.—Through the kindness of Dr. Flexner and the generosity of the Rockefeller Institute for Medical Research, the sanitarium was supplied with antidysenteric serum obtained from horses immunized against the organism, at Mulford's vaccine farm. The serum produced with both the "Harris" and "Shiga" types of the organism, i. e., those which form acid in mannite and those which do not, respectively, was sent separately. It had been found by Dr. Gay[8] to possess exceedingly high protective power for susceptible animals.

Unfortunately, because of the distance of the sanitarium from Baltimore, but few early cases came under observation and so little selection of infants thought to be favorable for the serum treatment could be made. Eliminating a number of instances in which the serum was given when the patient was *in extremis* or when a serious complication obscured its action, 20 cases remain to be recorded, all of them suffering from infection with the dysentery bacillus, in which were injected varying amounts of antidysenteric serum.

It may be mentioned here that the serum in all cases was given under the skin, using simple antiseptic precautions. In no instance whatever did any local infection, or other untoward accident, follow the injection. The welt produced by the serum usually disappeared in a few minutes. Comparatively little pain was given by the injection after the initial puncture by the needle.

The more salient facts concerning the treatment of these 20 cases are given in the table opposite.

The cases are arranged in three groups, according to the action of the serum: thus, A, those in which the serum seemed helpful; B, those in which the effect of the serum was doubtful; and C, those in which the serum was of no benefit. The clinical numbers of the cases in the second column correspond to those in the report of Dr. Winne. The variety of the serum used is designated by "S" or "H," that is, the serum was produced from an organism of the Shiga (so-called *alkaline*) or Harris (so-called *acid in mannite*) type, respectively. The table shows that of the 20 cases in but 5, or 25 per cent., was the serum of apparent

8. Univ. Penn. Med. Bulletin, November, 1902.

benefit (Group A). To these 5 cases could be added 4 other infants who presented similar symptoms and whose blood agglutinated the specific organism. As, however, the dysentery bacillus, which was probably present in small numbers, was not isolated from the stools, these additional instances of the "favorable" effect of the serum are not included in the series. In 5 other cases, 25 per cent., the effect of the serum was uncertain (Group B). The improvement which followed could not be definitely attributed to its use. In the 10 remaining cases, 50 per cent., no permanent benefit was derived from the serum treatment (Group C).

It was difficult often to determine the part played by the serum, when during the period of its injection the diet was altered and other therapeutic measures employed, and it was only after weighing all these other factors that the distribution in the above groups is suggested. Although the action of the serum in some cases of the Groups B and C seemed to be occasionally favorable, in none did it produce immediate and complete recovery, but it must again be recalled that almost without exception the babies brought to the sanitarium were of weak constitutions, ill adapted to resist disease or to respond to any serum therapy. In two-well-to-do children in Baltimore, injected promptly after the onset of illness during the summer, the serum was said to have a marked and early remedial effect.

A recital of the clinical histories of each of this series of serum cases would contain but little information not to be found in the table. In order to indicate more fully the effect, if any, of the serum treatment, two cases fairly illustrative of each group will be presented in some detail, after which attention will be briefly called to some suggestive features.

GROUP A. CASES IN WHICH THE SERUM WAS HELPFUL.

CASE 1.—L. W., girl, aged 6 months. Admitted to the sanitarium June 2 because of malnutrition. Breast fed for one week only, afterward given cow's milk diluted with equal parts of water, whenever it cried. Had never thrived; no gain in weight for several weeks. There was a possible syphilitic taint. The patient improved slowly at the sanitarium, with several intermissions, taking milk formulæ. The stools were large, light in color, usually pasty in consistency, occasionally contained curds. Weight, 7½ to 8 pounds.

Serum Treatment.—The notes pertinent to the serum are, in brief, as follows:

July 18—Patient doing well.

July 19—Patient became fretful; refused nourishment, and mucus appeared in the stools.

July 20, a. m.—Twelve hours after last note the stools were increased in number and contained more mucus and some blood. Pulse weak. Patient drowsy and almost in collapse.

One hundred c.c. salt solution and 30 c.c. antidysenteric serum (Shiga) were injected hypodermically at 1 p. m. Milk stopped; no laxative or irrigation given.

Result.—In six hours patient's condition improved; took liquid well; stools contained no blood.

July 21—Baby had a good night. Seems much brighter and stronger; takes nourishment well. Stools fewer in number, containing less mucus and no blood; 20 c.c. antidysenteric serum (Shiga) injected at 2 p. m. Patient gained in strength slowly. Ten c.c. more of serum were given on July 26. Improvement continued for ten days, although the stools were mucoid.

On August 8 the child was again worse and blood reappeared in the stools. Twenty c.c. antidysenteric serum (Harris) were injected. In twelve hours the infant was much improved, the stools again fewer in number and free from blood.

There was little elevation of temperature during the illness. The child was taken home against advice on the following day.

SERUM THERAPY.

	Name.	Clinical number.	Age in months.	Duration of illness before the first injection, in days.	Number of injections.	Total amount of serum, in c.c.	Duration of serum treatment, in days.	Variety of Serum.	General condition of patient at first injection.	Result of serum treatment.	Condition on discharge.
	L. W.	123	6	1	7	120	20	S	Acute attack at sanitarium in marantic infant.	Favorable, fewer stools, brighter.	Unimproved.
GROUP A	E. B.	171	14	9	7	110	14	S	Comatose, irregular pulse, mucus and blood in stools.	Slightly favorable, slow recovery.	Well.
Treatment Beneficial	W. C.	195	4	4	5	50	7	H	Poorly nourished, collapsed, extremities cold.	Favorable.	Well.
5 Cases.	M. S.	222	2½	6	1	10	1	H	Poorly nourished, listless.	Favorable, brighter, recovery prompt.	Well.
	G. M.	300	5	10	5	60	8	H	Poorly nourished, collapsed.	Favorable, lower temperature.	Well.
	L. F.	160	17	25	3	30	4	H	Fair condition, numerous stools cont'g muc. and bld.	No immediate improvement.	Improved.
GROUP B.	H. G.	242	6	10	2	40	2	S	Fair condition.	Serum of doubtful effect.	Improved.
Treatment doubtful.	R. C.	274	7	14	6	110	7	H	Collapsed, semi-comatose.	Action of serum, if any, slow, temp. reduced.	Improved.
5 Cases.	V. Z.	308	8	50	4	40	3	H	Poorly nourished, muco-purulent stools with blood.	Slow, doubtful.	Improved.
	I. R.	338	3	16	2	20	2	H	Poorly nourished, feeble.	Inert or slightly helpful.	Improved.
	S. O.	210	5	7	3	30	3	S	Emaciated, drowsy.	Serum seemed at first helpful, later inert.	Died.
GROUP C.	J. B.	221	2½	22	6	100	21	S & H	Poorly nourished, extremities cold.	Serum inert.	Died.
	M. S.	223	6	30	8	170	18	S	Collapsed, semi-comatose; poorly nourished.	At first helpful, then inert.	Died.
Serum	D. J.	273	7	14	14	230	16	S & H	Furunculosis.	Inert.	Unimproved
treatment	R. M.	278	3½	15	3	60	3	S & H	Emaciated, collapsed.	Inert.	Died.
	M. S.	287	4	30	13	200	20	H	Collapsed, drowsy.	Inert.	Died.
inert.	W.W.	301	6	30	5	70	10	H	Emaciated, marked rickets, drowsy.	Improvement (?) first, inert later.	Died.
	M. K.	309	12	22	7	90	11	S & H	Poorly nourished.	Inert.	Died.
10 Cases.	A. S.	330	9	17	3	40	3	S	Poorly nourished.	Inert. (Bronchopneumonia.)	Died.
	F. O.	333	12	30	4	60	4	S	Collapsed, sunken fontanelle, many stools.	Inert.	Died.

This case is of interest because it was the only one of the series observed from the onset of illness. The infection was contracted at the sanitarium, house flies being the probable conveyors of the bacilli. Here there was an apparent prompt response to the serum given early in the attack, on the part of a markedly marantic infant.

CASE 2.—M. S. (No. 222), girl, aged 2½ months. Admitted July 7, suffering from diarrhea. Since first week of life had been fed on Eskay's food and condensed milk; rice water since present illness, which began six days before with vomiting and diarrhea. Stools, ten to twelve in twenty-four hours; fluid, with mucus and lumps; no blood.

Examination.—The infant was fairly nourished, but rachitic. The thoracic organs were normal. On admission the patient was listless, with signs of toxic infection.

Treatment.—July 8, noon. Ten c.c. of antidysenteric serum was injected. Shortly afterward an extensive erythematous rash developed, which spread rapidly from point of inoculation, involving nearly half the child's body. After several hours the erythema quite disappeared.

Result.—In twenty-eight hours, without other treatment, the child's condition began to improve. The stools became fewer and more fecal in character. There followed an uninterrupted recovery, which seemed definitely to begin with the injection of the serum.

The two following cases are fair instances of a second group in which the improvement can hardly be directly attributed to the use of the serum:

CASE 3.—E. F. (No. 160), girl, aged 17 months. Admitted June 23 because of "diarrhea and weakness."

History.—The clinical history was, in brief, as follows: At five months of age had summer complaint, followed by measles and bronchitis in the fall. Not so strong afterward. Breast fed until thirteen months; since, milk, with table diet. The present illness began three weeks previously with diarrhea. Stools at home were green, offensive, and contained mucus; no blood.

Examination.—On admission the child was fairly well nourished, anemic, with a daily range of temperature from 100 to 103.

Examination of the chest and abdomen negative. The stools were fourteen to twenty in twenty-four hours, and contained mucus, pus and blood.

Treatment.—Treatment consisted in a change of diet to a cereal water; whey was added later. Bismuth subnitrate was given by mouth, and occasionally whisky as a stimulant. Frequent colon irrigations, usually with tannin and soda solutions, were employed.

The child's general condition remained good, but there was no abatement of diarrhea or fever.

On June 27 antidysenteric serum (Harris), 10 c.c., was injected. This was repeated June 30 and July 1, 30 c.c. being given in all.

There was no immediate change in the patient's condition. The number of stools was not decreased and the temperature remained elevated for several days. On July 3 the symptoms began to abate. In forty-eight hours the temperature became normal, blood and pus disappeared from the stools, and they were reduced to four in twenty-four hours. The child made a slow but complete recovery.

In this case the action of the serum, if helpful, was not prompt. It seems possible that the recovery might have similarly followed without serum treatment.

CASE 4.—R. C. (No. 274), boy, aged 7½ months. Admitted July 18 because of "summer complaint."

No history of previous illness. After five weeks baby was fed on cow's milk diluted with boiled water. Present illness began two weeks before with vomiting and diarrhea. Stools, ten to twenty a day, consisting largely of greenish mucus. There was fever throughout the attack.

Examination.—The child was admitted in a markedly toxic condition, eye dull and sunken, fontanelle depressed, skin bluish and dry, abdomen scaphoid and doughy, heart and lungs negative, temperature 101.5, pulse 150, of small volume and low tension.

Treatment.—Shortly after admission 20 c.c. of serum (Shiga) was injected. This was repeated daily, July 19 to July 29, using the Harris serum on and after July 20. A final injection of 10 c.c. was given on July 23—a total of 110 c.c. in seven days.

The morning after the first injection the child was less listless, but the temperature remained elevated, 101 to 102, and the character of the discharges was not altered. Calomel, change of diet and colon irrigations were also employed in treatment. On July 20 an infusion of 100 c.c. salt solution was given hypodermically.

Result.—The fever began to abate July 21, after which date it did not rise above 100. Some elevation of temperature persisted, however, for a week longer. The toxic condition cleared up slowly, but the mucus persisted in the stools and the appetite remained impaired.

The child was discharged August 2, against advice, as he was not considered "well." He died several weeks after his return home, apparently from a "relapse." Here the effect of the serum was probably beneficial.

The last two cases to be recorded represent a large group in the series, where the serum seemed to be quite inert.

GROUP C. CASES IN WHICH THE SERUM TREATMENT WAS OF NO BENEFIT.

CASE 5.—M. S. (Nos. 219 and 287), boy, aged 4 months. Admitted first on July 7 because of diarrhea.

Never ill before; artificially fed from birth with diluted cow's milk.

History.—Two weeks before admission the infant's stools became green and watery. A trace of blood was noted twice. No vomiting; no fever.

The symptoms yielded to a change of diet, and the patient was discharged apparently well in nine days. After five days at home the stools again became frequent and the child was readmitted July 22 in a much weaker condition. At this time there was no fever, and the stools contained mucus but no blood or pus, and the symptoms were those of intestinal indigestion.

Treatment.—On August 3 the patient grew suddenly worse. It became drowsy, the features were "pinched," the eyes sunken, and pulse weak and rapid. Stimulants were given and the serum treatment begun—10 c.c. (Harris). On August 5 two similar injections of 20 c.c. each, with 100 c.c. salt solution, were given.

The child's condition continued alarming until August 6, when for a few days the appetite improved and the infant seemed brighter. Further serum had been injected on August 6, 7, 8 and 10—50 c.c. in all.

Between August 12 and 16 the temperature, which had rarely reached 100, rose daily to 102, and the child became more listless. Serum was given August 13 and August 15, and following its use there seemed again some betterment. The temperature fell to 100, and nourishment was now readily taken.

On August 20 the infant again became worse, the temperature rose to 103. The stools were more frequent and contained considerable pus and blood. The patient from this time grew progressively weaker. The temperature remained elevated, with marked daily remissions, until the end, which occurred August 25. The blood and pus in the stools increased during the last days. The serum given at this time (60 c.c., August 20 to 24) seemed to have no effect on the general condition of the patient, the height of the temperature or the character of the stools.

Result.—In this case the effect of the serum was difficult to determine. Some improvement apparently followed its use August 6 to 12 and again August 16 to 20, but the betterment was of a transient nature, the serum being powerless to check the symptoms of toxemia or to cure the lesions in the intestines, as evidenced by the increasing amount of pus and blood in the stools. Two hundred c.c. of serum was given in twelve injections during 21 days.

CASE 6.—F. O. (No. 333), boy, aged 12 months. Admitted August 6, because of profuse diarrhea.

History.—The child had always been well except for an attack of pneumonia six months before, from which he had completely recovered. He had nursed for two months, and afterward had been fed with condensed milk, augmented later by some food from the table.

The present illness began four weeks previously with an unusually severe attack of vomiting and diarrhea, called cholera infantum by the attending physician. The symptoms abated and the child was thought to be "well," when a relapse suddenly set in two weeks before admission. The stools again became numerous, and now contained mucus, pus and blood.

Examination.—On entrance the child's condition did not suggest a very serious illness. He was fairly well nourished, with moderate rickety changes; eyes were bright; heart and lungs normal; abdomen markedly distended. There was a slight edema under the eyes, and on the dorsum of the hands and feet. Temperature, 99.8.

Treatment.—The intestinal tract was swept with calomel, followed by oil. The stools afterward continued frequent and mucopurulent in character, deeply tinged with blood.

Antidysenteric serum (Shiga), 20 c.c., was injected on the day of admission and repeated the following day, while on each of the two succeeding days 10 c.c. was given—a total of 60 c.c.

Result.—The condition of the child remained apparently little altered, though the temperature gradually rose to 103. The stools were not reduced in number by various astringents, and the child died suddenly in convulsion on the sixth day after admission.

In this case, in which the infection had occurred a month before, the serum seemed of no help whatever.

Several features suggested by the table and the illustrative cases cited deserve some additional emphasis.

DURATION OF DISEASE BEFORE SERUM TREATMENT.

A striking fact brought out in the series is the relationship between the beneficial effects of the serum and the promptness with which it is administered. Thus, the average duration of the illnesses in the three groups, A, B and C, in which the effect of the serum seemed beneficial, doubtful and inert, was 7.4, 15.8 and 21.7 days, respectively. The most definite and rapid response to the serum treatment was noticed in Case 1, which was injected on the first day of the intestinal disorder. In this instance in six hours, although the infant was in an advanced stage of malnutrition, there was a definite improvement in its general condition, the character of the pulse and the number and appearance of the stools. It is recognized, of course, that these diarrheal cases are more amenable to all methods of treatment early in their illness than later, and that in none was the serum alone employed. Giving due regard to the value of these older procedures, experiments on animals,[8] as well as clinical observation,[9] seems to indicate that any healing effect of the serum is exerted in proportion to the promptness with which it is given.

In this regard results with antidysenteric serum accord with clinical experience in the treatment of diphtheria or tetanus, where the brilliant cures which follow the administration of the proper serum in the early stages of the disease are not effected if the use of serum therapy is long delayed. It is quite possible that antidysenteric serum will not prove to have as high curative value as have the antitoxins against diphtheria and tetanus. The cellular toxins, to which that produced by the dysentery bacillus and the typhoid bacillus belong, have not lent themselves as readily as have the soluble toxins to the formation of strong healing antitoxins.

Conclusive evidence on this point will be obtained only by the careful observation of a large series of cases. The children presented in the present series can not be considered ideally suitable for this test, both on account of the weakened constitutions of many of them and because also of the long duration of the illnesses before the serum could be given.

THE TYPE OF ILLNESS.

A consideration of the serum cases with reference to the clinical types of the disease may indicate in what instances help may be expected from serum therapy. The results can be briefly tabulated as follows:

ACTION OF SERUM.

		Helpful.	Doubtful.	Inert.
Toxic—				
Mild	0	0	0	0
Moderate	0	0	0	0
Severe	4	3	1	0
Inflammatory—				
Mild	0	0	0	0
Moderate	5	0	2	3
Severe	11	2	2	7
	20	5	5	10

Serum was not given to the small number of mild and moderate toxic cases in our series for several reasons. Three were admitted to the sanitarium before the arrival of the serum; others were convalescent from their acute symptoms; and in others the parents' permission which was always obtained before injection, could not be secured.

This arrangement of cases would suggest that the serum is helpful in toxic cases even though they be of the severe grade. In the inflammatory form of the disease, on the other hand, it is of little service if its administration is delayed. Thus, out of 16 cases belonging in this group, only 2 seemed aided by serum injection, in one of which it was given on the first, and in the other on the ninth day, while in the ten in which it seemed quite inert, usually more than a fortnight of illness had elapsed before it could be employed.

The inference from this standpoint is, that although more can be hoped from the antidysenteric serum in the treatment of the acute toxic cases than of those included in the so-called inflammatory types, that the promptness of injection is a more important factor than the clinical variety of the illness.

DOSAGE.

The serum was usually given in 10 and 20 c.c. injections at intervals of 12 to 48 hours, sometimes after a lapse of several days. Occasionally 30 or 40 c.c. was injected at one time. This amount was many times the preventative dose per body weight of animals, as determined by Gay.[8] In no case was improvement seen from 40 c.c. when a smaller quantity had failed to produce any effect. It did not seem possible to establish any relationship between the dosage and the result. It is questionable whether much larger amounts, i. e., 200 c.c. injected at one time, would have been more helpful. Apparently most of the cases benefited by the serum were those in which comparatively small amounts were given early in the disease.

THE NUMBER OF INOCULATIONS.

The number of inoculations varied from 1 to 18, extending over periods as long as 28 days. As has already been indicated, a series of cases of long-standing ulcerative ileocolitis were repeatedly subjected to serum therapy, with quite negative results; and it is felt that any beneficial effect of the serum, if present, can be de-

9. Shiga: Deutsche med. Woch., 1901, No. 43, p. 45; also Krusa: Deutsche med. Woch., 1903, No. 1, p. 1.

termined after the first or second injection. If there is then no betterment a continuation of the treatment is practically useless.

DURATION OF THE EFFECT OF SERUM.

It is well known that a single attack of summer diarrhea confers no lasting immunity on the infant, but rather seems to render it more susceptible to subsequent intestinal disorder.

The number of relapses already referred to in this series supports this view. In the light of these observations it is not surprising to find that the effect of the serum is a comparatively transient one. Rarely a single injection, as in Case 2, appeared to start the infant on a permanent convalescence; more frequently a slight betterment which followed a single injection proved to be but a trifling interruption to the progress of the disease.

If, then in a given case improvement follows the injection of the serum, this should be repeated until untoward symptoms are past. In several instances which had to be included among those in which the serum was doubtful or inert, the baby's condition brightened after the injection, and the treatment was not afterward given till the child again became alarmingly ill, when the serum, even in larger quantity, was of no benefit.

TEMPERATURE.

Of the effect of the serum on the temperature of the patient, no certain deductions can be made from our cases. Occasionally a drop in the temperature occurred shortly after the injection and apparently because of it. Examination, however, of a large number of cases discloses similar variations in the fever quite independent of serum therapy. Again, a gradual reduction in fever in a few instances appeared to follow the massed action of repeated injections of serum. In fact, the temperature, within moderate limits, in these disorders is no index of the condition of the patient, as many of the severest cases ran a comparatively afebrile course, and a further reduction in bodily heat may accompany a complete collapse.

NO COMPLICATION DUE TO SERUM.

Our experience would indicate that the injection of antidysenteric serum is a harmless procedure performed under antiseptic precautions. Once an erythematous blush, lasting a few hours, appeared on the body of an infant shortly after injection, and in one other case a moderate urticaria was noticed on the twelfth day following the serum therapy.

PATHOLOGY.

Of the fatal cases in our series, permission for autopsy was obtained in five instances. Two of the infants belonged clinically to the toxic, the remaining three to the ulcerative group. At the time of death two of the babies were fairly well nourished, two sparely nourished, and one markedly emaciated.

Most interest attaches to the condition of the alimentary tract. Nothing of interest was noticed in the mouth, except the occasional presence of the thrush fungus. The conditions found in other parts were as follows:

Esophagus and Stomach.—In all cases the mucosa of the esophagus was smooth and pale. The stomach was occasionally found moderately distended with gas. It usually contained some residue of food or medicine mingled with a slight amount of mucus. Once it was found filled with watery fluid, and in one instance it contained bile. In one case several linear areas of congestion 3 by ½ cm. were noticed at the crests of the folds of the mucosa. No definite hemorrhage and no loss of substance was present.

Duodenum and Jejunum.—These portions of the small intestine showed little change. The mucosa in all instances was smooth and covered with a moderate amount of bile-stained mucus. There was no marked distension present and no infiltration of the intestinal walls. The jejunum was once found slightly injected.

Ileum.—Changes in the ileum were absent in but one case, where the mucosa was smooth and pale and there was no gross swelling of Peyer's patches. In the other four cases there were definite pathologic alterations in the ileum, particularly in its lower third near the ileocecal valve. In this portion of the ileum were found scattered through the mucosa irregular areas of congestion often in association with multiple minute hemorrhages. The mucous membrane was usually thickened. The most conspicuous lesions were in association with Peyer's patches and the solitary follicles. These were enlarged and congested and often covered with a yellowish-gray necrotic material. In three of the cases there was ulceration in the ileum. The loss of substance was usually, but not always, in the lymphoid structures. Some of the ulcers were quite shallow and difficult to distinguish; others were deep and punched-out in appearance. Ofter a single patch was the site of multiple ulcers which united into a larger one, with irregular but not overhanging edges. None of the ulcers extended deeper than the mucosa.

Large Intestine.—The lesions in the large intestine were, as a rule, more pronounced. They were found throughout its extent, but were usually more marked in the sigmoid flexure, rectum and cecum. The mucosa was usually found thickened and congested. Hemorrhagic areas, minute or more extensive, were scattered here and there throughout the colon, occasionally in connection with the solitary follicles. These lymphatic structures were usually swollen and stood out as raised translucent dots against the mucosa. Often they were surmounted by a cap of yellowish-white material.

Ulceration was present in several of our cases. The ulcers varied from minute losses of substance not infrequently situated at the summit of the solitary follicles and others deeper, with punched-out borders, to extensive irregular areas denuded of mucosa produced by the confluence and extension of numerous single ulcers. This process in one case was so extensive as to leave in places only scattered strips of mucosa intact. Even in these instances the ulceration did not extend deeper than the mucous membrane, nor were the edges undermined. In no case was there noted any definite pseudomembrane more than the necrotic tissue seen here and there over a swollen Peyer's patch or solitary follicle or areas of ulceration. Mucus or mucopurulent material, frequently containing blood, was always present in the colon.

It is of interest to mention that in this short series of autopsies in one case there were found in the whole gastrointestinal tract no gross lesions; in another only three or four tiny shallow ulcers, and that in still a third case, although there were several good-sized ulcers in the lower part of the ileum, the large intestine was apparently normal.

Microscopic Examination.—A microscopic examination of sections from various portions of the intestines adds comparatively little. In some instances the wall of both large and small intestine showed no pathologic alterations; in others there was a moderate congestion of the vessels, particularly those of the mucosa and submucosa, with occasional hemorrhage and some serous exudation into the tissues. In the lymph radicles, Peyer's patches and the solitary follicles, there was a moderate proliferation of the small round (lymphoid) cells. The most prominent feature, however, was the serous infiltration of the gland tissue separating these cells from each other, exposing the fine fibrous filaments of the structure and explaining its increase in size. There was little polymorphonuclear invasion.

The ulceration observed began usually in the lymphoid nodules in the intestinal wall. The loss of tissue was found

to be limited usually to the mucosa; less frequently was the submucosa in part included. The muscle layers in our cases were invariably intact. The appearance of the ulcers was as though the lymph nodules had simply frayed out at the surface. The material lining the ulcer was composed of necrotic tissue without any evidence of organization. No fibrin was present.

The condition of the other organs may be referred to:

Heart.—No changes of importance were noticed in the heart; the valves were delicate, the musculature occasionally somewhat pale. There were no antemortem clots.

Lungs.—There was bronchitis with small patches of bronchopneumonia in three instances, in which the diarrhea had been of long duration. In one case this pulmonary complication was the direct cause of death. When the illness was comparatively acute the lungs generally escaped any alteration other than a slight congestion.

Liver.—This organ in the cases examined was little if any enlarged and usually reduced in consistency. The surface was smooth and edges rounded. On section, in some instances the lobules were hardly to be distinguished, the whole surface presenting a homogeneous appearance; in others the cut surface was made up of minute purplish areas surrounded by a network of yellowish-gray lines.

Under the microscope marked cloudy swelling was present in all cases, with more or less congestion. In three instances the most noticeable change was a fatty degeneration of the liver cells. This in one instance was of very pronounced degree, nearly all the cell protoplasm being replaced by large and small fat droplets. In association there was considerable enlargement of the hepatic capillaries.

It is interesting to note that the clinical history and general condition of the infant in which the greatest degree of fatty degeneration was present were not unlike those of the one showing the least liver alteration. This rather common form of hepatic degeneration seems to be dependent on factors at present little understood.

Kidneys.—There were no gross renal lesions made out other than an occasional cloudiness of the cortex partly obscuring the glomeruli and more or less dilatation of the vessels. The minute changes, together with moderate acute congestion, consisted in a parenchymatous degeneration, particularly of the cells of the convoluted tubules, and were of marked grade in but two instances.

Spleen.—This organ in our series presented few alterations. Its consistency was somewhat increased and the pulp was slightly darkened. In most cases the glomeruli were easily visible. Under the microscope, except for some congestion, little of pathologic nature was detected.

Examination of the thyroid, thymus, pancreas and adrenal bodies failed to disclose any abnormality.

Lymphatic Glands.—The most conspicuous and constant feature in the autopsies was the enlargement of the lymphatic glands of the mesentery. Frequently glands connected with all parts of both small and large intestine were uniformly swollen; in others the enlargement was most noticed in the glands of the mesocecum and colon, and more particularly in those draining the severely inflamed or ulcerated portions.

The glands varied in size from 2 to 3 mm. to 1.5 cm. They were fairly firm, whitish pink in color, often with dots of hemorrhage on their surfaces. Under the microscope a moderate proliferation of lymphoid cells with dilatation of the blood vessels was found. The increased size of these structures, as in the lymphatics of the intestinal wall, was due to the distension of the lymph channels and the separation of the cellular elements from each other by a serous exudate. The reticular framework of the glands could in many instances be readily made out. Scattered throughout the pulp were many large epithelioid cells apparently coming from the walls of the lymph vessels. There was little increase in the number of polymorphonuclear cells.

The pathologic alterations here referred to agree in the main with those found by Howland in a larger series of cases and reported to the New York Pathological Society.[10]

10. Medical News, vol. lxxxiii, 1903, p. 1191.

It is evident that the dysentery bacillus does not always produce in the infant a uniform pathologic picture, but is capable of setting up alterations differing widely, both in severity and extent, from cases where the intestinal wall is practically unchanged to those in which large areas of the mucosa, particularly of the large intestine, is lost. The typhoid and diphtheria bacilli, the pneumococcus, the gonococcus, and many other organisms are now known to have a varied pathology, and the dysentery bacillus in its manifold manifestations is in agreement with facts recently learned concerning the activities of these other well-known pathologic bacteria.

It is well, when possible, to classify diseases according to their etiology. Hence the name *Dysenteria infantum*, or infantile dysentery, has been suggested for diarrheal disorders in infants due to the dysentery bacillus. This term at once separates these cases from those of adult dysentery which present certain pathologic differences, and from the diarrheas in infancy due to other causes, either nutritive or bacterial.

SUMMARY.

The results of this study may be summarized as follows: During the summers of 1902 and 1903 epidemics of diarrheal disorders among infants and young children appeared in Baltimore. A large proportion of these cases properly investigated were found to be produced by the proliferation in the intestinal tract of the *Bacillus dysenteriæ* (Shiga), the variety of the organism being the so-called acid strain; that is, the type of the bacillus which ferments mannite with acid production. In the histories of the patients, in the clinical manifestations of the disease, and in the pathologic lesions, the cases appear identical with those of epidemic diarrhea which have recurred for many years among infants in Baltimore and other American cities, and there is good reason for the confidence that the dysentery bacillus is an important factor of this great scourge among children.

The disease begins in June, reaches its height in July, and gradually declines in August, although sporadic cases occur throughout the year. The number of cases appears to be directly increased by excessively hot weather. Children under one year are most susceptible; those over three years are rarely attacked.

Babies exclusively breast fed are less often affected; most of the cases occur among infants artificially fed. The simultaneous outbreak of so many widely separated cases suggests that the causal organism does not reach the baby primarily through the milk, but rather through a carrier common to all, such as water, and an investigation of the water supplied the ill babies makes this hypothesis possible, though other sources of infection are recognized.

Ill-nourished children, particularly those fed on condensed milk, are less able to withstand infection by the dysentery bacillus, and form a large proportion of the fatal cases.

The cases can be roughly divided into two groups—those in which the symptoms of toxemia are most prominent and those in which there is evidence of a destructive lesion of the bowel.

Mucus was noticed in the stools in all cases. Blood was present in the discharges in moderate amount in but 42 per cent., and pus in but 53 per cent. of the cases. Many of the deaths occurred late in the summer in long-standing cases of ileocolitis with ulcerated intestines.

The keynote in the treatment is promptness. If the food can be stopped and the alimentary tract emptied within a few hours after the onset of symptoms, most infections can be aborted.

The results of antidysenteric serum treatment were disappointing. It, too, was apparently helpful in proportion to the shortness of the time which elapsed between the beginning of the illness and the injection of the serum. Its use is perfectly harmless under antiseptic precautions.

The prophylactic injection of the serum into susceptible babies may prove to be an advisable procedure.

The alterations in the body produced by the action of the dysentery bacillus may be those of an acute toxemia only, or in addition there may be set up more or less destructive lesions of the lower bowel. In this latter process streptococci and other organisms may play a part. The constant change noticed in all cases was the enlargement (serous infiltration) of the mesenteric lymph glands.

THE BACILLUS DYSENTERIÆ (SHIGA) IN ITS RELATION TO THE DIARRHEAL DISEASES OF INFANTS.

A CLINICAL STUDY OF TWO HUNDRED AND THIRTY-SEVEN CASES.*

L. EMMETT HOLT, M.D.

Professor of Pediatrics in the College of Physicians and Surgeons.

NEW YORK CITY.

The early history of the work done on the dysentery bacillus has been so often published that it need not be repeated here. It is to Duval and Bassett that the credit is due of first pointing out the fact that this organism played an important part in the diarrheal diseases of infancy. Working under the direction of Dr. Flexner at the Thomas Wilson Sanitarium, Baltimore, in the summer of 1902, Duval and Bassett studied 53 cases of diarrheal disease in infants and young children, in 42 of which they demonstrated the presence of the dysentery bacillus. After a considerable number of positive cases had been found, 25 cases were taken successively and from 19 of these the dysentery organism was isolated. They established the connection between the organism and the disease by obtaining positive agglutination reactions in a very considerable number of their patients.

In the autumn of 1902, at my suggestion, Dr. Martha Wollstein, at the Babies' Hospital, began a systematic study of the cases of acute disturbance of the intestine, and continued the investigations until the following May, in order to discover whether this organism would be found in winter cases as well. She studied, in all, the discharges from 114 patients, representing almost every phase of acute intestinal disorder; in 39 of the 114 cases the dysentery bacillus was found. It was never absent where the clinical picture was a definite one of acute disturbance characterized by the presence of blood and mucus in the stools.

In 1903, under the general direction of Dr. Flexner, the Rockefeller Institute undertook to continue this investigation by making simultaneous observations at different centers, with a view of throwing further light on the relationship existing between the dysentery bacillus and diarrheal diseases in summer. Work was carried on in New York at the Babies' Hospital, Nursery and Child's Hospital, Vanderbilt Clinic, Foundling Hospital, Infirmary for Women and Children, Bellevue Hospital; in Baltimore, in the out-patient department of Johns Hopkins Hospital and the Thomas Wilson Sanitarium; in Boston, at the Floating Hospital, and at the Children's Hospital in Philadelphia.

The bacteriologic reports of this investigation have been edited by Dr. Flexner and have recently been issued. The present paper is a summary of the clinical reports of 237 cases in which the dysentery organism was present. These cases were observed by the following persons:

Drs. John Howland and L. E. La Fétra, Vanderbilt Clinic	62 cases.
Dr. Louise Cordes, Infirmary for Women and Children	26 cases.
Dr. Samuel Amberg, Baltimore	19 cases.
Dr. Louis M. Warfield, Bellevue Hospital	7 cases.
Dr. J. H. M. Knox, Jr., Thomas Wilson Sanitarium	43 cases.
Dr. Robert Hastings, Boston Floating Hospital	28 cases.
Dr. R. G. Freeman, New York Foundling Hospital	7 cases.
Dr. Dorothy Reed, Babies' Hospital	45 cases.

Several of these persons have already published their individual reports. It is the purpose of the present paper to combine the results of the investigations of the summer of 1903 to see what light they have thrown on our conception of summer diarrheas of infants, and especially what results have been obtained, and in the future what may be expected from the serum treatment.

Considerable new light has been thrown on the subject of diarrheal diseases in infants and young children by this investigation, although much still remains to be done. The summer was not a particularly fortunate one for such an investigation, as it proved to be an unusually cool season, and the diarrheal diseases were neither so frequent nor so severe as in average years.

Several points were prominently brought out by the different clinical observations:

1. The infection with the *B. dysenteriæ* occurs under quite a wide variety of conditions. It is seen in breast-fed infants as well as in those artificially fed.

2. It occurs (*a*) as an acute primary infection in children previously well; (*b*) as a subacute infection without previous acute symptoms; (*c*) coincident with or following other acute diseases, such as measles, pneumonia, etc.; (*d*) it is often seen as a terminal infection in children suffering from extreme malnutrition or marasmus.

3. It occurs as a mild intestinal disorder with few symptoms, and these hardly more marked than those belonging to intestinal indigestion; also with local symptoms of considerable severity, yet with very little fever or constitutional depression; and finally, in its most severe form, with both local and constitutional symptoms of great severity.

4. It is not a disease of any one locality, having been seen with great and about equal frequency in all the large cities—New York, Boston, Philadelphia and Baltimore—where investigations were carried on; the only variation in type being that in the warmer cities the proportion of severe acute cases was rather larger. Nor is the disease one of tenements and hospitals, a number of the cases observed being in children living under the best surroundings, even in the country. In its prevalence, it appears to be as widespread as are summer diarrheal diseases.

PREVIOUS DIET.

The clinical reports include observations on 237 cases. The previous diet was studied in most of these in the

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Diseases of Children, and approved for publication by the Executive Committee: Drs. S. W. Kelley, H. M. McClanahan and John C. Cook.

hope of gaining some information as to the mode of entrance of the organism into the body. Of the cases observed, 26 were previously breast-fed. While in most of these the infection was a mild type, some were severe and even fatal. That these attacks were, as a rule, milder than most of those seen, may be in part at least explained by the better physical condition, and consequently the greater resistance of the breast-fed infants. That so many attacks were seen in nursing infants shows that we must seek for some other mode of entrance of the specific organisms than with the milk. Possibly it may be the water, although in this the dysentery bacillus has not yet been found. The practice of boiling water for the use of infants is seldom followed in the tenements, and water in some form was given to almost all the children. No special relation of the infection to any other food or any special kind of feeding could be discovered.

RELATIVE FREQUENCY OF INFECTION.

The relative frequency of infection with the dysentery bacillus as compared with other diarrheal diseases of infancy can not be definitely stated from these reports. In only two groups of cases were systematic examinations made of consecutive cases. In the others, the cases for examination were more or less selected, and hence it is impossible to draw conclusions from them as to relative frequency. The two groups of consecutive cases were those from the Vanderbilt Clinic, a summer series reported by Howland and La Fétra, and those from the Babies' Hospital, a year-round series, reported by Reed. In the first group of cases the dysentery bacillus was found in 62 of 64 cases examined. They included every sort of intestinal disturbance attended by diarrhea. These figures, however, do not prove that in every instance this organism was the cause of the disturbance. In some of the cases the number of dysentery bacilli was apparently very small; sometimes only one or two colonies were discovered after a prolonged and careful search. But their presence even in such small numbers is interesting as showing possibly how mild attacks might develop into severe ones.

In this connection I should like to refer to some studies just completed at the Babies' Hospital by Dr. Wollstein on the stools of normal children. During the past winter and spring, observations have been made on 56 children with a view of determining (1) whether dysentery bacilli were present in the stools of normal infants; (2) whether they could be obtained postmortem from scrapings of the mucosa of children dying from other diseases.

Stools of 32 children, all under 18 months of age, were studied with great care by the following method: Patients who had been in the hospital several days and had been observed to have normal discharges were selected. The colon was washed out with one or two quarts of a saline solution, after which a cathartic, castor oil or citrate of magnesia, was administered. All stools passed in the next ten hours were studied. In no instance were dysentery bacilli discovered.

In a series of 24 cases studies were made of scrapings from the intestinal mucosa in children dying from diseases other than intestinal. In 21 no dysentery bacilli were found. They were present in 3 cases, but 2 of these presented rather marked evidences of inflammation of the intestinal mucous membrane, not suspected during life; while in the third a history was obtained of a previous attack of diarrhea, and this case showed swelling of Peyer's patches and some congestion of the mucous membrane of the colon.

In one entire year's service at the Babies' Hospital about one-half of all the cases exhibiting clinical evidence of acute disorders of the intestinal tract showed dysentery bacilli.

These observations indicate that dysentery bacilli are an important etiologic factor in the intestinal diseases of young children, both in winter and in summer; but that they are present in a much larger proportion of cases in summer than in winter.

CLINICAL TYPES.

Of the cases studied, 91 were classed as examples of severe infection. These were characterized by much mucus and generally blood in the stools, usually fever, but not always high, and by marked general prostration. There were 81 examples of moderately severe infection, in which there was much mucus and often blood in the stools, some fever but not much constitutional depression. There were 63 examples of mild infection, in which the constitutional symptoms were very few; blood was seldom present; there was little or no fever; but the stools almost always contained mucus. These figures indicate only that mild infections are very common; their relative frequency, however, is probably much greater than is stated here, since by several observers only severe cases were taken for examination.

The types of disease were essentially the same at all places where the observations were made. Infection with the dysentery bacillus was associated with almost every sort of intestinal disturbance accompanied by diarrhea, with, however, one notable exception, viz., the severe acute intestinal intoxication called "cholera infantum," with its sudden violent onset, protracted vomiting, high temperature, frequent serous discharges, great prostration, early collapse and often early death. There was only one case which at all approached this type, and this lacked some of the essential features. The infection with the *B. dysenteriæ* is associated rather with the inflammatory forms of diarrhea, and of all degrees of severity, the mildest and the most severe, the acute, the protracted and subacute; occurring both as a primary disease and a secondary disease, often occurring in institutions during the summer as a terminal infection in infants suffering from marasmus, exactly as does bronchopneumonia under similar circumstances in winter.

Up to the present time the organism has not been found in cases of chronic intestinal indigestion in infants and older children, even though mucus was present in the stools in considerable amount. In this series of cases there were observed no chronic cases such as have been described in adults where bacilli were found after many months. The cases of long duration which were studied in infants were usually free from bacilli at the end, death being due to progressive marasmus.

The most characteristic clinical type and the one with which the organism was almost invariably found associated, was the acute febrile form with stools containing much mucus and usually streaked with blood. For these cases the term "infantile dysentery" would seem the only proper appellation. This type seems so distinctive that we may safely regard it as a separate and distinct disease.

TYPES OF ORGANISM.

Of the 237 cases studied clinically, the "Flexner-Harris" or "acid" type of organism was present in 207, the true Shiga in 23, and both organisms were present in 7. No difference could be observed in the clinical manifestations in the different forms of infection. Further-

more, the relative frequency of the different types was nearly the same in all places where the observations were made.

Whatever may be said of the dysentery of adults, it would appear from these data that in infants and young children, in our large eastern cities, it is the acid type of organism rather than the true Shiga with which we are chiefly concerned.

MORTALITY.

Of the 237 cases reported, 73 were fatal. This gives little idea of the gravity of the dysentery infection, since it is well known that the result in all forms of intestinal disease in infants depends on nothing so much as on the age and previous condition of the patients. Considerably more than half the total number, 139, were observed in hospitals. It was among these patients also that nearly all the deaths occurred, as might have been expected. The poor general condition of these patients and the late date of beginning treatment had most to do with determining the results. Again, in several it was noted that the patients recovered from the acute diarrhea but died subsequently from marasmus. Cases of this kind were seen in almost all the groups.

In all acute disorders of the intestinal tract complex conditions are present. No infection or intoxication can occur without producing marked functional derangement of digestion. In some cases the infection is slight, while the digestive disturbance is severe. The two bear a general but by no means a constant relation to each other. The child's symptoms may be due almost entirely to the indigestion and very little to the infection. These conditions stand in the way of success by serum treatment. While we may be able to combat the infection by the serum, it may be without any power to improve the digestive disturbance. It also has a bearing on the question of diet during the attacks.

DIET DURING THE ATTACK.

The necessity of stopping milk during severe acute infections is universally agreed on. There is, however, some difference of opinion in regard to the desirability of withholding milk from cases of moderate severity, without temperature, where the disease seems to be limited to the large intestine. In these cases the symptoms from which the child suffer are chiefly those of wasting from chronic indigestion. There seems to be little doubt from the experience at the Babies' Hospital and Vanderbilt Clinic, that many of these cases do much better on a properly modified milk than on other substitutes employed, such as broth, barley water, albumin water, etc., with which the loss of weight is very rapid. In such cases the infection seems to play a minor part and the indigestion a major part, and, therefore, one should not have his attention too much on the presence of a specific infection, but should manage the child's diet according to general principles, as in other forms of acute or subacute intestinal indigestion. The mere presence of dysentery bacilli in the stools is, therefore, in itself no reason for withholding milk, and its intelligent use seems to give much better results than the substitutes usually employed.

PREVENTION.

The fact that the dysentery infection is contagious seems to be established, but how and to what degree is not yet proven. In four instances, small ward epidemics were noted. From present experience a high degree of contagion does not seem probable. The spreading takes place most likely through the discharges. This calls attention to the necessity for disinfection and the closest attention to prevent contamination of food or water by persons handling the child's napkins. The rule followed in the Babies' Hospital is a good one for all institutions, viz., that the nurse in charge of the children's napkins shall not at the same time have anything to do with the food or the feeding.

SERUM TREATMENT.

In all there were 83 cases in which the anti-dysenteric serum was employed; 38 of these were fatal. On the whole, the results were disappointing. No unfavorable symptoms followed its use in any case. In a few instances eruptions, usually urticaria, followed, as occasionally after diphtheria antitoxin. In only 12 cases did a noteworthy improvement appear to follow its administration. A careful study of the cases in which the serum was used does not make the results quite so bad as at first appears. Too much evidently was expected. The physicians had in mind the striking effects seen after diphtheria antitoxin. These were observed in no instance, and it is doubtful if they ever will be. The conditions in the intestines are very complex and in no way comparable to those which are present in diphtheria. Great disturbances of digestion are in most cases present, and the consequences of this remain long after a specific infection may have disappeared. Difficulties were found in the use of the serum. The quantity in the strength in which it was used was large. The mothers of dispensary patients would not allow its use except in severe cases, and often would not return for a second dose. A brief summary of the cases seems desirable.

Freeman's Report.—Seven cases treated; all hospital patients; in 2 the attack followed measles; one child had diphtheria and pneumonia. In 4 cases no improvement. In 3 improvement apparently occurred, but 2 died later from marasmus long after the intestinal symptoms had disappeared. The only case which recovered was that of a nursing child. Full doses were given, all but one receiving from 5 to 10 doses of 10 c.c. each.

Howland's and La Fétra's Report.—Ten cases treated; all dispensary patients. Serum used only in the severe cases. Two children received but a single dose; result unknown, as they did not return; 2 died, one moribund when treatment was begun, the other recovered from diarrhea, but died long after from marasmus; 2 showed decided improvement after the serum. In the other 4, no apparent effects. Rarely more than 2 doses of 10 c.c. given.

Amberg's Report.—Ten cases treated; 2 hospital patients, 5 private practive, 3 not stated. Of the 5 severe cases, 3 ended fatally, 1 improved and 1 recovered; of the 6 moderately severe cases, 5 recovered, 1 improved. Only one case received an injection on the first day and one on the second day; 3 had been sick four to six days and 6 more than one week. Six cases received two doses and 4 five doses of 10 c.c. each.

Warfield's Report.—Seven cases treated; 2 observed in tenements, 5 hospital cases; 4 died. Two were moribund when the serum was given and one other had pneumonia; 3 apparently benefited by the serum. Two patients received but two doses; all the others received much larger quantities, one patient being given 150 c.c.

Hastings' Report.—Fourteen cases treated; all hospital patients. Serum was used only in the severe cases. Seven of these were fatal. Details of the fatal cases only are given; one of these was moribund at the time of the administration, one died in the seventh week of the disease; 5 were in poor condition at the time of the attack. No striking improvement seen in any case.

Knox's Report.—Twenty cases treated; of these 9 were fatal. Three cases apparently improved from the serum; in 17 apparently no improvement.

Cordes' Report.—One severe case seen late, no apparent effect.

Reed's Report.—Fourteen cases; all hospital patients; nearly all severe infections. Temporary improvement seen in several, permanent improvement in none. In 9 cases only one 10 c.c. dose was given.

Such, in brief are the facts regarding the use of the serum in the 83 cases in which it was employed. That decided improvement appeared to follow its use in only 12 of the patients is not very encouraging. Several factors worked against success. In a large proportion of the cases it was used late in the disease. Again, it was as a rule used only in the most severe cases; and, finally, at the beginning of the season no rules had been formulated as to the size and frequency of doses, hence it is evident that many of the doses were too small. Four patients were moribund at the time the serum was given. Of the 83 cases, 67 were hospital patients, and all familiar with hospitals for infants know the class of patients referred to.

The conditions of success, however, are, first, that it must be used early, before serious lesions have developed or before the patient's general nutrition has been too profoundly impaired. The latter refers particularly to cases in young infants. The second point is that experience shows that the serum must be used in repeated doses, one or two doses given each day and continued for several days if the attack is severe. I can not myself feel from a study of these reports and from personal observation of some of these patients, that an adequate trial of the antidysenteric serum has yet been made. The favorable cases for its use are surely not the subacute infections, where the symptoms relate much more to the functional disturbance of digestion and the resulting impairment of the child's nutrition, than to the specific toxemia of the dysentery bacillus; nor again can anything be expected from it in attacks which develop late in a condition of marasmus in hospital patients. The promising cases are rather the sharp acute attacks with symptoms of severe infection occurring in infants or older children with some powers of resistance. In other words, in patients where the real problem is to combat the infection, and not to maintain the nutrition of patients, which even before the infection was a matter of the greatest difficulty.

Inasmuch as at present nearly two days are required for a bacteriologic diagnosis, and as the agglutination reaction is seldom present until the end of the first week of the disease, if used at all, the serum must be injected on a clinical diagnosis. Its use would then be indicated in children taken with acute intestinal symptoms with blood and mucus in the stools, or with very much mucus in the stools with fever and symptoms of general infection. The serum surely must be used early, and it must be given repeatedly, since what is desired is to stop a process and not to neutralize a toxin.

All rules as to dosage and frequency must at present be tentative. From the experience of the past summer it would appear that a dose of at least 10 c.c. should be used daily in a moderate case, this being repeated two or three times daily in a severe case.

Since we have no means at present of differentiating clinically the cases in which the infection is with the acid or Flexner-Harris and with the true Shiga type, it would seem best to use a serum from animals immunized against both types of the organism, or that from animals immunized against the acid type, since by far the largest number of cases in young children are of this variety. Although the serum obtained from animals immunized with true Shiga is not without some effect in infections with the acid type, and vice versa, this is much less than when the animals are injected with the special type of organism concerned.

A beginning only has been made with the use of the antidysenteric serum. A much more extended trial and on more carefully selected cases is necessary before definite statements can be made as to its value.

14 West Fifty-fifth Street.

SOME FINDINGS IN SUMMER DIARRHEAS OF CHILDREN.*

JOHN C. COOK, M.D.
CHICAGO.

These cases came under observation during July and August, 1903, and are reported to show the relative frequency of some bacteria not ordinarily given prominence in this relation. The study was begun with the hope of making some clinical deductions from the microscopic findings and to trace, if possible, any bacterial relations between the buccal cavity and intestinal disorders.

Twenty-nine cases in all were observed and cultures were simultaneously made from mouth and fecal discharges, and observed as nearly together as possible, but much of the work was not completed owing to the sanitarium closing before all the cultures were worked out.

No note will be made of the ordinary inhabitants of the canal, such as colon groups, staphylococcus, etc., but only such as may have some pathologic bearing on the clinical findings.

CASES 1, 2 and 3.—Nothing of value was found, notwithstanding that there were some clinical features present, such as vomiting and loose bowels, which were found in other cases bacteriologically more interesting.

No. 4.—Breast-fed; aged four months; diagnosis of enteritis. Gave history of from five to six loose, offensive movements daily for four or five days; temperature from 96 to 100; vomited frequently. Cultures were taken from oral cavity and bowel movements, but nothing was found but pink yeast bacilli and staphylococci from the mouth.

No. 5.—Aged six months. Came to sanitarium July 27, with normal temperature and history of from three to five loose brownish bowel movements a day. On the fourth day after admission a curdy exudate appeared in the roof of the mouth and on the inside of the cheeks, and some on the outside of the gums, resembling thrush a little. With this came a slight rise of temperature and loose greenish movements, six to eight a day. This condition was not influenced by treatment for more than a day at a time, when it would lapse back to the same state, and the child died on August 18. Cultures from mouth and movements both showed *Bacillus pyocyaneus*. A postmortem was not permitted.

No. 6.—Entered the sanitarium July 6, with temperature 103; three or four loose green bowel movements in twenty-four hours; vomited once or twice. Child was 18 months old and fairly well nourished; had been nursed for first two months of life, when the supply failed; since had been fed on diluted cow's milk. Cultures from oral cavity showed nothing out of the ordinary. *Bacillus pyocyaneus* was found in the culture from bowel movements. Child left the sanitarium on August 4, not in good condition.

No. 7.—Aged nine weeks; normal temperature; partially breast-fed and partially on store milk diluted; frequent green bowel movements; vomited occasionally. *Bacillus pyocyaneus* in bowel movements only. Did not return.

---

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Diseases of Children, and approved for publication by the Executive Committee: Drs. S. W. Kelley, H. M. McClanahan and John C. Cook.

No. 8.—Aged eleven months; rachitic; came from day nursery. Had from three to four yellow sour movements in twenty-four hours; only vomited once in two or three days; had been fed on some proprietary foods; child was under observation for nearly a month and during that time had three to four movements a day, sometimes green, but mostly yellow or brown in color. *Bacillus pyocyaneus* was found in the dejecta only. Child was fed on milk, proteids 1, fats 3, hydrocarbonates 7. Gained rapidly and was discharged cured on August 29.

No. 9.—Aged ten months; ran a normal temperature after first twenty-four hours; two to four yellow bowel movements a day, only occasionally showing any green; did not vomit.

Nos. 11 and 12 were of no interest bacteriologically. No. 12 was colored and markedly rachitic.

No. 13.—Aged five months, was presented for treatment August 6, at 4 p. m. Temperature 99, and history of having been sick three days. Vomiting and frequent green offensive bowel movements. Child was given a bath and colonic flushing, and two ounces of barley water to drink. At 12 midnight, temperature was 104.6, pulse 150, respiration 72; child died at 1:45 a. m. A culture from the mouth grown on bouillon, developed the *Bacillus mycoides*. On interrogating the mother, she said the baby had been fed on one cow's milk, the animal being owned by one of the neighbors. The same day she brought some of the milk from which the baby had been fed the day before, also a specimen of milk secured from the owner of the cow that day. Both contained *Bacillus mycoides*. Not being familiar with the bacilli, we believed we were dealing with an anthrax, so visited the cow and found her healthy and giving a good quantity of milk. The owner said the cow had always been well, but some of the neighboring children said it had been sick about a week before, so it would not eat for two or three days.

No. 14.—Aged four months. Came under observation August 7, with normal temperature and history of vomiting and loose bowels for past week. It had been fed on malted milk, barley water, oatmeal water and condensed milk. Temperature was normal for next four days, with one exception; on the third day it went to 101 and back to normal; three to four green, offensive movements a day, and vomited about once a day until fifth day, when it was sent home convalescent. *Bacillus pyocaneus* was found in the fecal discharges.

No. 15.—Aged four months; temperature 100.2 Child had been sick one week; six to ten green, watery bowel movements in twenty-four hours, sometimes very offensive; vomited once or twice a day; catarrhal stomititis and bronchitis; very emaciated, showing marked degree of starvation rigidity; improved during its stay at the sanitarium—three or four days. *Bacillus mycoides* and *Bacillus pyocyaneus* from mouth culture; nothing worthy of note developed from fecal culture.

No. 16.—Aged three years; well nourished; temperature 101. Child had a round white patch on inside of left cheek, size of a half dollar, resembling noma, which spread to roof of mouth on same side, causing necrosis of the soft parts, irregular in shape. This yielded in four or five days to local treatment—peroxid of hydrogen and saturated solution of chlorate of potash. Klebs-Loeffler bacilli were found from culture of mouth, no fecal culture being made. No paralysis resulted, and, notwithstanding that the child mingled freely with other children, there was no spread of the disease.

No. 17.—Aged six months; had pain in the bowels, green discharges containing undigested food; vomited some mucus. Temperature 99, increased steadily, reaching 104.2 on the fourth day, when it began to subside. *Bacillus pyocyaneus* was found in mouth and fecal discharges.

No. 18.—Aged eight months. Was one of a pair of twins, the other one having died two weeks before. Temperature from 97.6 to 99.2; had one or two daily, and about the same number of night, movements containing undigested food, yellow, turning green on exposure; vomited occasionally. *Bacillus pyocyaneus* was found from stool culture, also from oral cavity.

No. 19.—Entered the sanitarium August 14; aged ten months; temperature 102.4, which rose to 105 within the next twenty-four hours. Child was having from eight to twelve green movements a day, containing mucus and undigested food; temperature ran from 102 to 105, with about the same number of movements a day for the next seven days, when temperature gradually subsided, but the number of movements kept up, with very slight disturbance of the stomach. Child retained food well unless given too much. Temperature did not go above 99.6, but there was little change in the number or character of the bowel movements until the 16th day, when she died. *Bacillus pyocyaneus* was found in the feces only.

No. 20.—Aged 14 months, entered the sanitarium August 10. Temperature 99.8, and varied from 98 to 100 until the ninth day after admission, when the temperature went to 103.6 about two hours before death. Child had from three to five movements daily, dark brown to green; vomited very little. *Bacillus pyocyaneus* was found in the bowel discharge but not from mouth culture.

No. 21.—Five months old, normal temperature; had frequent light green bowel movements; did not vomit; condition improved daily for three or four days, when she was sent home.

No. 22.—Six months old; was brought to the sanitarium for three or four days; temperature normal; had frequent dark brown movements; did not vomit. No bacteria found from either mouth or movements.

No. 23.—Only present once for treatment. Child was twelve days old; breast-fed; had from eight to ten loose yellow movements a day. No bacterial findings.

No. 24.—Seven months old. Child was brought for treatment July 22, with the following history. Had been fed on raw milk and Mellin's food; began vomiting this morning; later the bowels became loose, with offensive light-colored movements containing quantities of undigested food. If food was not immediately vomited, it passed through the bowels in from 20 to 60 minutes; temperature ranged from 98.6 to 100. The first day of illness she weighed 12½ pounds. Three days later her weight was 7 pounds. After forty-eight hours vomiting ceased and food was retained in the bowels long enough to nourish. In the course of a month the child weighed 12¼ pounds. *Bacillus mycoides* was found in the stools.

Nos. 25, 26 and 27 gave negative results, both from mouth and fecal cultures.

No. 28—Eight months old. Child had been well until the last days of August, then began having loose green bowel movements, containing quantities of mucus and streaked with blood; vomited three or four times in first twenty-four hours; had been fed on dextrinized gruel with top milk; temperature went to 102; great prostration but rapid recovery. *Bacillus pyocyaneus* was found in the stool culture.

No. 29.—I saw child for the first time when it was three days old. It had vomited that morning and the mother said it acted sick; temperature 100; had been nursed since birth; mother's milk was still full of colostrum; towards night of the third day the child vomited several times and the bowels became very loose. I advised the breast-feeding stopped and the breast pumped out, and gave albumin water. The vomiting ceased as soon as nursing was discontinued, and by the fourth day the bowels did not move oftener than every three to five hours. Albumin water was continued until the morning of the fifth day, when the child was put on the breast, which it took willingly. After the third nursing it vomited, and by the middle of the afternoon the bowels had begun to run off and she vomited again. Nursing was again discontinued. A few small yellow blisters appeared on the head and face that afternoon. I advised the nurse to open them but by the next morning the upper third of the child, including the head and face, was covered with the same sort of a papular eruption and the bowels were very loose—three or four offensive watery movements every hour. The baby was kept nourished on barley and albumin water. A culture was taken from the mouth, also a specimen of milk was drawn aseptically and a culture made from it. *Bacillus mycoides* was found in both. The baby had a little temperature for a week, the pustules gradually drying up; the condition of the bowels had improved so much that we once more tried the

breast, with the same result as before. The child was then put on dextrinized oatmeal gruel with top milk, and it is now a well, strong child, having fulfilled the ordinary requirements of weight and measurements. This was the third baby in the family—a girl—the two older children being boys and both had been strong and nursed for a short time. No miscarriages or other evidence or history of syphilis. The mother had a small abscess in one breast before the milk was dried up.

THE RÔLE PLAYED BY THE BACILLUS PYOCYANEUS.

Holt speaks of pyocyaneous infection in ulceration of the intestinal canal.

According to Sternberg, the *bacillus pyocyaneus* was obtained by Gessard (1882) from pus having a green or blue color, and since carefully studied by Gessard, Charrin and others. This bacillus appears to be a widely distributed saprophyte, which is found occasionally in the purulent discharges from open wounds, and sometimes in perspiration and serous wound secretions (Gessard).

Morphology.—A slender bacillus with rounded ends, somewhat thicker than the *Bacillus murisepticus* and of about the same length (Flugge); frequently united in pairs or chains.

Biologic Characters.—An aerobic, liquefying, motile bacillus. Grows readily in various culture media at the room temperature—more rapidly in the incubating oven.

Temperature Above 100	Pyocyaneus in Stools	Pyocyaneus in Mouth	Mycoides in Stools	Mycoides in Mouth	Klebs-Loeffler in Mouth	Vomited	Green Movements	
No. 4	No. 5	No. 5				No. 4	No. 5	
No. 6		No. 6				No. 6	No. 6	
						No. 7	No. 7	
	No. 8					No. 8	No. 8	
							No. 9	
No. 13				No. 13		No. 13	No. 13	
No. 14	No. 14					No. 14		
No. 15		No. 15		No. 15		No. 15		
No. 16					No. 16			
No. 17	No. 17	No. 17				No. 17	No. 17	
	No. 18	No. 18				No. 18	No. 18	
No. 19	No. 19						No. 19	
No. 20	No. 20					No. 20	No. 20	
						No. 21		
No. 24			No. 24			No. 24		
No. 28	No. 28					No. 28	No. 28	
No. 29						No. 29	No. 29	Blood
12	8	5	1	2	1	14	12	

Of the 12 cases with temperature above 100, 6 had *Bacillus pyocyaneus* in stools; 5 had *Bacillus pyocyaneus* in mouth; 10 vomited; 7 had green movements.

Of the 8 cases with *Bacillus pyocyaneus* in the stools, 7 had green movements.

Of the 5 cases with *Bacillus pyocyaneus* in mouth, 1 had *Bacillus Mycoides* in mouth.

Of the 14 cases that vomited, 6 had *Bacillus pyocyaneus* in stools; 4 had *Bacillus pyocyaneus* in mouth.

Of the 12 cases with green movements, 7 had *Bacillus pyocyaneus* in stools; 4 had *Bacillus pyocyaneus* in mouth.

Does not form spores. The thermal death point, as determined by Sternberg, is 56 C., the time of exposure being ten minutes. In gelatin plate cultures colonies are quickly developed, which give to the medium a fluorescent green color; at the end of two or three days liquefaction commences around each colony, and usually the gelatin is completely liquefied by the fifth day.

Pathogenesis.—The experiments of Sternberg, Lederhose, Bouchard and others show that this bacillus is pathogenic for guinea-pigs and rabbits. Subcutaneous or intraperitoneal injections of recent cultures—one cubic centimeter or more of a culture in bouillon—usually cause the death of the animal in from twelve to thirty-six hours.

More recently Donald R. MacIntyre[1] of Ann Arbor has shown that the *Bacillus pyocyaneus* contains an intracellular toxin, and his excellent article has shown that the toxicity of the powdered germ substance of *Bacillus pyocyaneus*, when injected intraperitoneally into guinea-pigs in the proportion of 1 part to 50,000 parts of body weight, is surely fatal. When injected subcutaneously in guinea-pigs, even in as large a quantity as 1 part of the toxin to 10,000 of body weight, the only inconvenience that resulted was a slight swelling at the point of inoculation, followed by temporary loss of weight. Subcutaneous injections did not give immunity to subsequent intraperitoneal treatments.

1. THE JOURNAL A. M. A., April 23, 1904, p. 23.

THE BACILLUS MYCOIDES.

The *Bacillus mycoides* has been isolated from cow's and mother's milk and also found in the oral cavity and fecal discharges of children. When grown on agar-agar bouillon, it grows very much like the anthrax bacillus. However, after a few days' growth the bacterial cell seems to grow as a shorter rod and with a rounder end than that of the bacillus anthrax. When grown in beef bouillon, it grows as a flocculent mass on top of the liquid.

When from 1 to 3 c.c. of beef bouillon culture is injected into guinea-pigs there is a decided cellulitis in the tissues around the point of injection. Forty-eight hours later the animal showed a decided toxic condition, with languor, and did not take food, and in about two to seven days the entire body seemed to be in a bloated condition. When the bouillon cultures were filtered out and the solution injected free from bacteria, very much the same symptoms were present, with the exception of the cellulitis that was manifest in the injection of the solution containing the bacteria themselves.

None of the animals died that were inoculated with the growths in the bouillon. Injections beneath the skin from very recent cultures on milk produced no effect, but an injection of 1 c.c. of milk culture, twenty-four hours' growth, produced very much the same symptoms as those injected with the bouillon; and forty-eight hours' growth in milk showed signs of a more toxic condition. There was considerable swelling around the point of injection. Twelve hours after the injection was made the animal began to show symptoms of inactivity. In twenty-four hours it refused food and began to bloat. This increased to the fifth day, when it died in convulsions. The organism could not be found in the blood of the animal nor in any of the body tissue except the spleen, where it was found in considerable quantity.

These inoculations were made in six guinea-pigs. Three of them died within six days, one on the tenth day, and the other two recovered after a long time.

This organism has not been classed as pathogenic so far as I have been able to ascertain—that is, it does not produce any specific disease, still it appears to possess the power of producing a toxic substance in milk, resembling that of ptomains.

The first twenty-four hours' growth in bouillon, gelatin or agar-agar has to such an extent the general characteristics of anthrax that I found it impossible to distinguish one from the other under the microscope. However, after forty-eight hours in agar the chain-like appearance which is seen in anthrax slides began to be broken up, and the ends of the rods of the *Bacillus mycoides* became more rounded in appearance and they soon lost a great deal of their resemblance to anthrax. In the cultures of the twenty-four to forty-eight hours' growth there is to be distinguished large refractive bodies in the cells of the bacteria which, from general appearance, might be taken for spores, but with the method of

staining for spores we were unable to decide whether or not these refractive bodies were spores. However, in old, dried-up cultures there is to be found nothing but the round or oval forms of the micro-organism, which has a great resisting power to heat and many of the antiseptic solutions.

THE MANAGEMENT OF SUMMER DIARRHEA.*

THOMAS S. SOUTHWORTH, M.D.
Attending Physician Nursery and Child's, New York City Children's and Minturn Hospitals, Physician Out-Patient Department Babies' Hospital.
NEW YORK CITY.

Trite as may seem the subject, the first hot days of the summer call up a picture of the blanched and sunken faces of the sad little army which besiege the doors of our offices, hospitals and dispensaries in the lifeless days of summer. It is a smaller army than of yore, thanks to the agitation for pure milk and the ever-widening knowledge of the proper methods of prophylaxis and treatment, but the work of such discussions as will follow this group of papers has not yet been done nor will be done until human ignorance or human life disappears from the earth.

ETIOLOGY.

Believe as we may concerning the preponderance of etiologic factors—bacterial, dietetic or meteorologic—the fact remains that diarrhea among infants and young children leaps to the front with the inception of the warm season, and claims our attention as the most common disorder until the cooler weather of the early fall forces it again into the background. It shall be the purpose of this paper to inquire into the advances made during recent years in the prevention and treatment of this scourge and to set them forth as clearly as may be.

In the search for etiologic factors, much that is of scientific interest has been compiled concerning the influence of sustained high temperature of the atmosphere in producing this affection. This influence is variously explained, either as favoring the development and multiplication of hurtful bacteria which may gain access to the digestive tract, or else so lowering, by its prostrating effects, the resistance of the individual host as to render him less able to cope with the invasion. Both factors doubtless play their parts, and since we can not influence the weather bureau, we must needs profit by the suggestions which they furnish for intelligent prophylaxis.

PROPHYLAXIS.

Prophylaxis, which, after all, is the supreme ideal of medical science, may well begin long before the summer opens, and many a life sacrificed might be saved by proper preparation for the ordeal which is to come; diet should be regulated and simplified, overfeeding in frequency and amount corrected, digestive difficulties of all grades, however slight, overcome, anemia and the protean gradations of malnutrition and rachitis actively combated.

Whenever it is possible children of susceptible age should be sent early into the country where the days and more especially the nights are relatively cooler than in the city. If such removal is not feasible as in the vast majority of families, the coolest and best ventilated rooms should be chosen for their occupancy, clothing should be as light as is compatible with proper protection from sudden changes, they should spend as much time out of doors as possible in the daytime properly protected from the sun's rays, on the shaded side of the street, in public parks and open spaces, beneath trees or along water fronts, if these be accessible, and at night they should sleep in well-aired rooms. The functions and cleanliness of the skin should be promoted by the morning bath and evening sponging with cool or tepid water.

It may be stated as axiomatic that the healthy child is less susceptible to diarrhea, or if attacked, far more amenable to prompt and intelligent treatment. While all breast-fed children do not escape, the number affected of those who are exclusively nursed is relatively very small, and the numbers increase in proportion to the administration of other articles of food, whence the time-honored dread of the dangers not of the first, but of "the second summer."

METHOD OF INVASION.

Squalor, careless, improper and injudicious feeding and contaminated milk are probably accountable for most of the trouble. Squalid environment, which usually involves the other causes, furnishes many of our cases, but it should not be forgotten that bacteria may gain entrance to the digestive tract, even among the well-to-do in other ways than through bad milk and uncleanly nursing bottles, and that thumb-sucking and the use of rubber-sucking nipples or "baby pacifiers" should be discountenanced as serious elements of danger.

The investigation carried on among the poor of New York under the auspices of the Rockefeller research fund and published by Park and Holt show that the purer and cleaner the milk the safer it is in the summer months, but since this safety is one of degree only, and since milk produced under ideal conditions is obtainable in but few localities and often at a cost too great for general use, it is a safe and conservative position to assume at the present day that, unless we are assured of the absolute freshness as well as the cleanness of the milk supply, and furthermore, unless there be some valid reason for the choice of raw milk, the milk for infant feeding during the summer months should be subjected early to pasteurization or sterilization, according to the particular prejudices of the physician, in order to guarantee reasonable hope of protection to the infant.

The term summer diarrhea has been employed purposely in the title of this paper, because while looseness of the bowels may arise at this season from many different causes, and at their inception with varying severity of symptoms, the great majority of them hold possibilities of later serious developments and call for radical and earnest treatment at the outset, at which time remedial measures are almost sure to be effective. There is the greater need of emphasizing this point, because those cases which at once show serious symptoms are naturally more alarming, and in consequence receive attention, while those of the slighter and milder degree are more often neglected until secondary infections have become engrafted, which are of vastly more serious import.

Thus much of the bowel disturbance of summer is purely dietetic and digestive, due either to some special indiscretion, or, as so frequently, to the inability

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Diseases of Children, and approved for publication by the Executive Committee: Drs. S. W. Kelley, H. M. McClanahan and John C. Cook.

of the child to digest, in hot weather, food with which on cooler days there was no apparent difficulty. Allow this, however, to advance a day or two without suitable treatment or change in diet, and the disturbed mucosa, secretions and contents of the digestive tract become a suitable field for the development of forms of bacteria which the system would readily cope with in health.

WITHDRAWAL OF MILK FROM THE DIET.

While uncleanly and infected milk is responsible for many cases, it is doubtless an error to ascribe all summer diarrheas to this cause, nevertheless it should be remembered that since milk is capable of superimposing additional disturbances in a considerable number of cases, it should be stricken from the diet for absolute safety. Although there are unquestionably exceptions to this rule, it may be asserted and reiterated with the utmost positiveness that no one of twenty remedial measures has such life-saving effects in summer diarrhea as the prompt and absolute withholding of milk and the removal of all milk residue from the digestive tract on the appearance of frequent disturbed stools. Could this one measure be made absolute in every household and institution of the country, the mortality from diarrheal diseases would become insignificant.

There are no reliable means of distinguishing the cases in which milk will or will not do harm. To give milk to the wrong child is to supply him with the materials for the elaboration of dangerous toxins and for the growth of countless myriads of destructive bacterial organisms. Were it proper to end this paper at this point, it would be with the firm conviction that the most important word had been spoken. It is not our good fortune, however, to see every case in the early stages, and there are other measures which must be carried out with intelligent understanding and common sense before the patient is restored to health.

Let us first have a clear appreciation of the conditions existing in the tract which we are to treat. If the diarrhea be of digestive origin we have a mucous membrane congested and irritated and a nervous and muscular mechanism endeavoring by increased and disordered action to throw off their contents, the by-products of whose faulty chemical processes are causing the disturbance by contact or absorption. If the difficulty be from contaminated milk, the process is only dissimilar in that the special bacteria which have been introduced multiply rapidly in the favorable medium and add their toxic products to the disturbance of the tissues and by absorption to the general system.

Continue but for a time these derangements of function, during which much of the natural protective power of the bowels is in abeyance and the bars are down for invasion of the intestinal wall itself by pathogenic organisms feebly or actively opposed by the rallying leucocytes, and mucous and submucous tissues suffer severely in their integrity, as so often happens to the hard-fought battlefield of contending forces.

There would be less hesitation in instituting rigid initial measures could every man study, microscopically and macroscopically, the intestines of some of these old neglected cases, swollen, congested, ulcerated, and see through the microscope the epithelium swept away, the mucosa and its glands eroded, and the blood vessels and lymph spaces choked with what were the bodies of the living, the dying and the dead combatants.

TOXIC SYMPTOMS.

We have thus far spoken chiefly of the intestinal symptoms, but what of the effects of the toxemia on the rest of the body—the high temperature, the vomiting, restlessness, thirst, emaciation and prostration, the results of toxic absorption and of continued futile efforts to eliminate poisons which may be constantly recruited if milk be continued in the diet, and which directly or indirectly causes the death of the patient.

RATIONALE OF TREATMENT.

The picture given above is a common one enough, but before outlining a plan of treatment which is both simple and, if instituted early, usually effective, it will be well as a preliminary to set forth in plain terms what it is proposed to do and the reasons for so doing. The diarrhea, or diarrhea and vomiting, are no less than efforts of the digestive tract to rid itself as quickly as possible of something which it reflexly discovers to be hurtful. So long as that something remains in the body, the diarrhea is conservative, and any attempt to check it completely defeats Nature's purpose and is injurious. We should rather aid Nature in expelling it, and then, if necessary, assist in closing the flood gates which have been so rudely opened that the closing mechanism is out of order. Moreover, if the offenders be the teeming bacteria of spoiled or infected milk, not only must these poison-producing hordes be driven out, but no additional quantity of milk, however small or however disguised, should be allowed to reach the bowels until the whole brood has been exterminated, other forms of nourishment being supplied in which they do not multiply. Diarrhea with or without vomiting has not, however, arisen without considerable irritation of the organs concerned, which renders them incapable of immediately resuming their usual functions, and that which we supply in the way of nourishment must be of the simplest and blandest nature, until the whole system has recovered from what is really a serious shock, and the tone of the digestive apparatus shows that it is again restored by the subsidence of previous symptoms and the return of normal appetite. It must be evident, from what has just been said, that the earlier such rational treatment is begun the less injury will have been inflicted, and other things being equal, the earlier and more certain the recovery.

TREATMENT.

We have thus seen that the immediate indications for treatment in a case of summer diarrhea are of a triple nature, and every mother, nurse and physician should know them by heart. They are to stop milk and substitute a bland diet, to thoroughly clean out the digestive tract, and then, and not till then, employ means to check excessive peristalsis and secretion of the intestines.

Removal of Cause.—Castor oil and calomel are both efficient in sweeping out the bowel contents, and each has its special indications and advantages. Where improper and undigested food is known to be the cause or there be blood or much mucus in the movements, castor oil one to two drams acts promptly and relieves irritation. Where there is vomiting, intestinal decomposition or considerable temperature from absorption, and especially when the trouble has existed some time, calomel may be preferable in doses of 1/10 grain every half hour up to 1 grain. It is a gastric sedative and intestinal disinfectant, while it favors more normal hepatic action.

Lavage.—Where vomiting plays an important part gastric lavage with lukewarm water or solution of bicarbonate of soda (1 dram to 2 pints) may be most useful in cleansing the viscus.

Intestinal Irrigation.—I have found intestinal irrigation to be necessary less frequently than formerly, doubtless owing to rigid adherence to the rule of stopping milk at once, but it is of the utmost importance where the temperature is omniously high, the toxic symptoms pronounced, and in neglected cases. In conjunction with the administration of laxatives by the mouth, which should never be omitted, nothing compares with it when properly administered in promptness and efficiency in cleansing the colon and reducing high temperature. Plain water should not be used, but a normal salt solution (1 dram to 1 pint), employing a fountain syringe and a moderately firm catheter, number 14E or small rectal tube, introduced in the lithotomy position with hips elevated while the water is flowing, some nine or ten inches into the sigmoid flexure or beyond.

The irrigation should be thorough, at least two quarts being used, as it escapes at intervals beside the tube, and if the body temperature be high it may be cool, but if low and there be much weakness it should be warm. With much congestion evidenced by blood in the stools tannic acid (one teaspoonful to the quart) may be added with advantage. Irrigation gently and skillfully performed with an elevation of the reservoir of not over three feet does not increase prostration, but like other judicious hydrotherapeutic measures stimulates and soothes and is often followed by restful sleep. Retained fluid is, in part, absorbed greedily by the depleted tissues of the body and thirst is thus relieved.

Intestinal Sedatives and Disinfectants.—Medication of the disturbed digestive tract next demands our attention with the four-fold purpose of relieving irritation, restoring normal secretion, favoring disinfection and checking peristalsis, if excessive. The drug which of all others has stood the test of time and experience in meeting the first three at least of these indications and often the fourth, is the subnitrate of bismuth, which is sedative, mildly astringent and disinfectant. It has the further advantage of being nonpoisonous in the relatively large doses which are necessary. It is often given too timidly, and so ineffectually. Ten grains should be given every hour at first to children under one year of age until improvement occurs with the characteristic discoloration of the stools, then every two hours may be sufficient. It has been a matter of observation that where this discoloration, which is probably caused by the action on the bismuth of hydrogen sulphid in the bowel, does not appear in the stools, it is ineffective.

This may be remedied when required, as suggested by Kerley, by giving lac sulphur in grain doses. The frequency of the movements often subsides under bismuth treatment alone, but where the number of the stools exceeds six or eight in twenty-four hours, and particularly if they be fluid and large, special medication may be necessary. Opium fulfills this indication, and should be given separately, so that its dosage and frequency may be regulated independently of other remedies. Dover's powders ¼ to ½ grain every two to four hours stand first, and paregoric, minims 5 to 15, second for this purpose. We repeat that high temperature and foul stools indicating retained toxic products forbid locking up the bowels.

DIET.

The dietetic treatment of these cases is of an importance second to none. Looseness of the bowels without temperature or vomiting in an exclusively breast-fed infant may allow of a continuance of carefully regulated nursing, but in all other cases milk, even breast milk, should be withheld until the disturbance has subsided or its simple character becomes evident. It would hardly seem necessary to specifically include whey, cream mixtures, sterilized milk, condensed milk and cereal foods containing dried milk in this ban were they not so frequently employed in such emergencies under various misapprehensions. Barley water plain or much better dextrinized, has stood the test well as a bland nourishment which taxes but little the enfeebled digestive powers. Its nutritive value is not high, but it serves the purpose.

Children seem to bear this diet with less loss of weight and prostration, if there be added to each feeding one-half to one teaspoonful of some preparation of the liquid peptonoid type. A good substitute, if dextrinized barley water is refused, is rice water. If these are both refused, I do not hesitate to use egg albumin water (white of one egg to one pint of boiled water, strained and salted), with the addition of a little brandy or the peptonoid preparations. I am aware that albumin water is not approved by some authorities, but beyond the fact that if made too concentrated it produces more odor, doubtless of proteid decomposition in the stools, I have not recognized other drawbacks. Beef juice, which as an animal proteid, should be open to similar objection, is often useful, although occasionally too laxative, which is likewise true of broths which we often have to employ, especially with older children. In addition to the fluid diet given at prescribed intervals plain water boiled and cooled should be given freely since thirst is a common symptom, and because the maintenance of free renal secretions renders the patient less liable to kidney complications resulting from the elimination of the toxins.

To recur now to the more definite treatment of a given case, we will assume that the child receives dextrinized barley water, or a substitute, every two or three hours, according to its age. This diet should be maintained two or three or four days, or even longer, until the acute symptoms, such as fever, vomiting, frequent loose stools, etc., have subsided, and the visible improvement in the patient and a return of appetite give definite indication for a cautious return to a milk diet.

It is during this period that the anxiety and importunity of the parents are most liable to overbear our judgment. In no class of cases is judicious starvation more important, or too early relaxation of our rules more disastrous. Breast milk may usually be resumed earlier than cows' milk, as easier of digestion, often on the second or third day, a few scattered nursings for short periods being first tried and these rapidly increased if there be no untoward symptoms. Cow's milk must be relatively longer withheld, and at the outset added to the other nourishment in small quantities, often only a teaspoonful to the usual bottle, never more than an eighth or a sixth of the whole, and the effect on the symptoms and stools carefully observed.

Experience teaches us to differentiate the gelatinous stool of barley water from one containing much mucus. It is a golden rule that appetite should always precede and exceed the amounts added. Several days should elapse of gradual increase in the strength of the food before it approximates that which the child took before the illness. It is often many days before the child can return to his old formula, and even then fat percentages frequently must be kept low lest they produce laxative effects. Some children must be kept on weak for-

mulæ until the end of the summer. In rare cases the addition of even small quantities of milk is not well borne until the cooler weather, and other forms of nourishment have to be continued in its place.

Severe and neglected cases may require stimulation in the acute period, with brandy or alcoholic solutions of peptones. Persistence of rather frequent loose or semi-solid stools, with fairly digested residue and with or without some mucus, but otherwise general improvement, if not readily overcome by the administration of opium, will often yield to 5 grains of tannalbin every four hours, or to three or four minims of dilute hydrochloric acid, combined with some digestive preparation. The routine use of some one of these digestive preparations may avoid disaster among the classes where we have reason to believe that the diet of the child will not be carefully guarded or our instructions for gradual resumption observed.

HYGIENE.

The hygienic rules which were laid down in the discussion of the topic of prophylaxis are of doubled importance in the treatment of the sick child. The patient should be bathed as often as required, not only for cleanliness, but for the reduction of fever, and for its well-recognized effects of quieting restlessness and improving cardiovascular tone. Fresh air and good ventilation should be insisted on in the sick room. In severe or desperate cases, if this is not possible indoors, the child should be kept out of doors, even at night. Trips on the water are well-recognized factors in saving life. A change from the city to country, seaside or mountain air is most salutory, provided it can be accomplished with a minimum fatigue, and for the latter reason long journeys are inadvisable.

Acute symptoms with temperature lasting over a week arouse grave suspicions of invasion and inflammation of the intestinal walls with their unfortunate sequences. Such cases pass into the class of ileo-colitis, demand special treatment by daily intestinal irrigation, and if recovery ensue, are slow in convalescing, since not the functions alone, but also the integrity of the bowel must be restored.

CHOLERA INFANTUM.

A few words should be added here concerning that really rare condition known as cholera infantum. The term has been grossly abused by application to all grades of summer diarrhea, thereby furnishing an excuse for cases lost, and enhancing the prestige of cases cured. The best clinicians of wide experience admit that they see typical cases but seldom, and it may be shrewdly suspected that modern treatment has decreased the number which present this picture.

The name should be reserved for those cases which, either at the outset or suddenly in the course of a milder attack, are seized with almost uncontrollable vomiting, hyperpyrexia, with very numerous large, almost clear watery movements, and consequent marked prostration and rapid emaciation as the fluids are drained from the tissues. It very possibly differs only in being a more intense intoxication. The most hopeful treatment is that by hypodermic injection of morphin sulphate 1/100 of a grain and atropin sulphate 1/900 grain, repeated at intervals until the profuse outpouring of serum from the intestine is checked.

CONCLUSION.

It will have been noticed that the subject has been treated in this paper without reference to special types of bacteria causing the disturbance. Thrown into confusion by conflicting reports concerning the common occurrence of the various types of so-called Shiga bacilli, our knowledge is too chaotic to serve as a basis for classification. During the same summer of 1903, when Howland and Lafetra found Shiga types in 62 out of 64 cases of all grades of summer diarrhea from all parts of New York City, similar cases of all grades and from all parts of the city were being treated in my service at the out-patient department of the Babies' Hospital, according to the principles above outlined, with gratifying success. Although bacterial studies were not made of our cases, it is inconceivable that, drawn from similar sources, they should not have shown, if examined, like findings.

Under this rational and scientific treatment, if directions are carried out, I expect recovery in all save a very few neglected or extremely marantic cases.

807 Madison Avenue.

DISCUSSION

ON PAPERS BY DRS. KNOX, HOLT, COOK AND SOUTHWORTH.

DR. J. P. CROZER GRIFFITH, Philadelphia, believes that we have not yet proved the etiologic relationship of the Shiga bacillus to the various forms of diarrhea. This in no way detracts from the importance of the investigations. They have not yet been completed nor been carried far enough to make them conclusive. Further study is to be looked for. Dr. Griffith believes, in the early withdrawal of milk in these cases, whatever the cause of the diarrhea. Some French authorities treat their cases by the administration of water only during several days, and he has no doubt that this is preferable to the use of barley, rice or egg water, but he should hesitate to resort to it, because he does not think the average parent would be willing to carry out such instructions. We must not resort to the use of opium early, nor, on the other hand, should we withhold it too long. It requires careful consideration in every case to know when to begin its use, but it is a most important and valuable drug in diarrhea.

DR. JOHN LOVETT MORSE, Boston, believes in giving an initial purgative, followed by withholding food but giving water. He has used the French water treatment for several years, and finds that the babies do better and have fewer complications if they are given as much water as they would have taken with their ordinary diet. Albumin water, barley water, etc., are but poor substitutes for milk, as regards their nutritive value. The white of one egg, for example, contains only two-thirds as many calories as one ounce of milk. The nutritive value of an ounce of albumin water, made as it usually is by mixing the white of one egg with 8 ounces of water, is, therefore, not one-tenth that of an ounce of milk. He believes that if milk is diluted to the same degree, it will usually agree with the infant as well as does albumin water. He favors the early use of milk in diarrhea, but he does not believe in withholding it so long as is often done.

DR. DAVID E. ENGLISH, Millburn, N. J., believes very strongly in the starvation treatment of diarrhea. He instructs the mothers to put an ounce of whole barley into a pint of water; this is boiled for fifteen minutes, strained through a sterile cloth and a pinch of salt added. This pleases the mother and does not harm the baby. He does not think babies are given a sufficient amount of salt.

DR. THERON W. KILMER, New York City, said that although care is usually taken as to the character of the milk or water fed to babies, it is often put into dirty and unsterilized nursing bottles. Every nursing bottle should be boiled daily for at least half an hour, and there should be as many bottles as there are feedings.

DR. R. B. GILBERT, Louisville, Ky., believes that the smallest perceptible amount of opium given in the diarrhea of infants is dangerous and injurious. If an anodyne is needed he prefers chloral hydrate. If the colon is flushed with a strong saline

solution the pain will be relieved without the use of an anodyne. He believes in the starvation, or rather the water treatment of infantile diarrhea; the use of the various diluted broths, such as barley water, amounts to little else. The water is improved, in his opinion, by aërating it.

DR. ROSA ENGELMANN, Chicago, said that physicians who work in the dispensaries and slums see other insects, such as fleas, bedbugs and cockroaches, that are not above suspicion as disseminators of disease. A possible instance of this came under observation not long ago in Chicago. In a large apartment house containing about twenty families five cases of typhoid fever were reported. The first case developed on the lower floor, and the second case on the same floor, in the apartment on the opposite side. The two families on the floor above moved away, leaving that floor vacant. In the course of a month the third case developed on the third floor, and subsequently two more cases developed on the fourth floor. The source of the infection could not be traced to the water supply (artesian), to the milk nor to the ice. It was learned, however, that this apartment house was absolutely overrun with cockroaches, contaminating the food supply. In the apartment house opposite, where there were no cockroaches, with the same water supply, no cases of typhoid fever were reported. It was unfortunate that none of the cockroaches was caught and allowed to run over a culture medium, and thus proved to be the source of the infection; since they, of all insects, are water inhabitants and consequently probable disease carriers. Investigation should be done along these lines, as has been done with fleas and bedbugs in respect to plague.

DR. WM. T. WATSON, Baltimore, said that the mothers in his practice are, most of them, very busy women, who can not afford to employ nurses. He likes to make things as easy for them as possible. He thinks that Dr. Kilmer's advice to boil nursing bottles for an hour is carrying precaution to an unnecessary extreme. Surgeons do not boil their instruments for an hour. According to Rotch, all bacteria are killed at a temperature of 154 F., and Abbott says that all pathogenic bacteria and their spores are killed by five minutes' boiling. Boiling for five minutes ought to be enough for the disinfection of bottles, which is merely surface disinfection. During the past few years Dr. Watson has been feeding an increasing number of babies on raw milk. The milk comes from the Walker-Gordon farm and is modified at home. Where the mothers are intelligent he finds no trouble to arise from feeding this milk raw. He asked Dr. Southworth if he considers this a rash practice.

DR. WILLIAM L. STOWELL, New York City, said that raw milk for infant feeding has been used at the Children's Hospital a portion of the time for the past six years. At present they are using the gravity cream from their own dairy. The milk was given raw, except in extremely hot weather, and he was surprised to see how weak children thrived on it.

DR. W. H. F. PARK, New York City, said that it has been proved that the *Bacillus dysenteriæ* is the cause of infantile dysentery. He said he believed that the Shiga bacillus gives rise to typical symptoms. There are many different kinds of bacteria in the intestinal tract, and in every case of infantile diarrhea the special organism found should be clearly identified and labeled.

DR. J. H. KNOX, JR., does not think it is claimed by anyone that the *Bacillus dysenteriæ* (Shiga) is the cause of every case of infantile diarrhea. The differences culturally between the so-called "acid" and "non-acid" type (to mannite) are not striking, no more so than differences known to exist between the various colon and typhoid bacilli. He said that it must be conceded that in their series the dysentery bacillus was found in the several varieties of intestinal diseases both mild and severe, called, clinically "summer diarrhea," and it is felt that it is responsible for a large number of these cases. The importance, however, of other bacteria should not be minimized. In many cases streptococci and other pathogenic organisms were present in the intestines. It may be that when there is evidence of ulceration we may often be dealing with a secondary infection with streptococci superimposed on that by the dysentery bacillus.

DR. THOMAS S. SOUTHWORTH, replying to Dr. English, said he does not know how long a baby can live without milk or cream, but he does know that babies, depending on their age, have lived for weeks and months on food other than milk. In reply to Dr. Gilbert, he said that he has recommended the use of opium only for the control of excessive peristalsis in cases where the movements are more frequent than is necessary for a proper drainage of the bowel.

TREATMENT OF APHASIA BY TRAINING.*

CHARLES K. MILLS, M.D.

Professor of Neurology in the University of Pennsylvania; Neurologist to the Philadelphia Hospital.

PHILADELPHIA.

As long ago as 1880 I published an account of a case of aphasia greatly benefited by training which was largely of the patient's own initiation and conducted by himself.

The patient fell in an apoplectiform attack, and was taken to one of the London hospitals, where he was seen by Dr. Sieveking and Dr. Broadbent. He was a right hemiplegic and was also totally aphasic and agraphic, but appeared not to have been word deaf, as he understood what was said to him. He had lost all ideas of numbers, but was evidently not word blind, as he understood from the first what he saw in print or in script. When he read aloud he had a marked form of paraphasia, his speech being of the jargon or gibberish type. Like many such patients, he read off this jargon as if to himself he were reading correctly. He could copy, although unable to write spontaneously. After a time he improved under rest and internal remedies. He then began, partly under direction, to try to improve his powers of speech and of writing. He was a man of considerable intelligence, of fair education and of great determination.

This man came under my observation about two years after the attack which caused his aphasia and accompanying condition, having returned to this country, and he remained under my care for several years, during which time he slowly but continuously improved until he became able to communicate both in speech and in writing without difficulty. When I examined him he could understand all that was said to him. He could answer almost any ordinary question, although he occasionally mispronounced and was at a loss for a word. It was particularly difficult for him to remember the names of individuals, although he could give a connected account of his former life. Specimens of his writing, of different dates, showed progressive improvement in writing, spelling and in the formation of sentences. He could count, repeat the multiplication table and add and subtract simple sums. He could name objects pointed out to him much better than when studied by Dr. Broadbent.[1] Instead of reading gibberish he pronounced almost every word correctly, stumbling only occasionally over a large word; each word was distinctly separated from the others, but he did not hesitate.[2]

In connection with this early recorded case I shall refer to a case treated by me during the past year, that of a well known physician, forty-five years old, residing in one of the Western States.

In July, 1902, he had an attack of right hemiplegia with complete aphasia, first consulting me eighteen months later. The paralysis, although still marked, was much improved. No loss of sensation and no affection of the bladder or bowels were present. The face was the seat of a moderate right-sided paresis, the tongue not deviating to either side. The deep and

---

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Nervous and Mental Diseases, and approved for publication by the Executive Committee: Drs. Richard Dewey, F. W. Langdon and H. T. Pershing.

1. Brain, vol. I, January, 1879.
2. Mills, C. K., Med. Bulletin, Philadelphia, May, 1880.

superficial reflexes were of the usual type found in cerebral hemiplegia, exaggerated knee jerk with front tap and ankle clonus and the Babinski response being present on the right side.

When tested with Wyllie's[3] physiologic alphabet it was found that he could repeat the vowels i, e, a, o, and u well, having been previously trained in their pronunciation, but he could not remember them from day to day. In like manner he could repeat the consonants of the alphabet, but could not recall them spontaneously. He was partially word deaf, having regained word hearing to some extent by time and training. He could understand most familiar expressions, but if a strange or unusual word were used he did not understand it. He was also partially word blind, having relearned to read considerably before he was seen by me. With his left hand he was able to write the words that he could read. He could not understand the meaning of such prepositions as *of*, *to*, and *for*, if pronounced or read. He could not spontaneously write these words when asked, but could copy them graphically.

In connection with a study of his reacquisitions of language, particular attention was paid to the degree in which he regained different parts of speech. It was noticeable that in his efforts to talk he chiefly used his nouns and verbs, occasionally employing a pronoun. The words which expressed the qualities of things, which join and relate things to each other and to actions, in other words, adjectives, adverbs, conjunctions and prepositions, were still almost entirely eliminated from his vocabulary. Auxiliary verbs, like to have, and to be, in all their modes and tenses, were apparently without any meaning to him. The word is or was occurring in the sentence seemed to worry him. In brief, this patient was a hemiplegic aphasic, the aphasia having at first been both sensory and motor and nearly complete, an appreciable degree of recovery from his word deafness, word blindness and even motor aphasia having occurred under the method of training by repetition and by efforts at spelling, reading and writing.

With the assistance of Dr. T. H. Weisenburg and of the patient's secretary, a systematic and progressive course of training was at once instituted, this being continued under my direction for several weeks, and since up to the present time on similar lines at his own home. Letters, words and the names of objects were repeated by him after others or as the result of reading, in so far as he could do this, this being simply a continuation of the methods previously employed. In the next place the physiologic alphabet of Wyllie was employed.

Since becoming acquainted with this alphabet, in every case in which I have attempted to train or to have trained an aphasic I have made use of it, varying, of course, the sentences employed in illustration. A special effort was made to test it in the present case, as the patient saw at once its value and the method of adapting it to his own case. He was able to improve his manner of using the vocabulary which he had regained by the methods of repetition, to articulate and denunciate with more clearness, that is, with greater ease to make use of the words, sentences and phrases which he had from time to time reacquired. The physiologic alphabet, however, like the method of training by mere repetition from dictation, reading or otherwise, had its limitations with him. The patient could be carried only a certain distance by these methods, which it was necessary to supplement by others. The letters, words and physiologic sounds, or many of them, often could not be recalled even after they had apparently been thoroughly acquired, one of the chief reasons for this probably being that they were remembered only as separate entities and were not recalled in their relations to other words in description, that is, in phrases and sentences. After a time a phonetic reader was used to some extent.

In this book the sounds of letters and of their combinations are taught by special associations with objects, and in sentences which advance from simple to more complex forms similar sounds are repeated in various combinations. The sound element rather than the meaning of the sentences is made the first object in the method of instruction, although the words, phrases and sentences employed have definite meanings and are spelled in the usual manner.

Much use was made of the dictionary, chiefly by the patient's own initiative. He made considerable advance by looking up the definitions of words and when he found words and expressions in the definition which he could not comprehend, these in their turn were looked up at the appropriate place. A language primer and a grammar were next employed, the patient being instructed much as a child would be in the nature and use of the parts of speech, in the methods of conjugating verbs and of giving the cases of nouns, attention being particularly paid to the repetition of illustrations of the manner of using what was being acquired. The patient, in other words, was retaught, insofar as possible, the grammar which he had learned in childhood and which had slipped away from him as the result of the cerebral lesion.[4]

After the patient's return to his home I received from time to time communications regarding him. He steadily improved though at first his progress was comparatively slow. Three months after his return his secretary wrote as follows: "Dr. X. continues to improve right along, and as he puts it, 'slowly, slowly up hill.' He impressed on me to tell you that if he were told anything of length or importance, he missed some of it at times, but if it were written and he could see it, he understood it all. He reads his papers and magazines alone now all of the time and understands fully."

Three months later she again wrote as follows: "At the present time there is a noticeable improvement since his stay with you. I am sorry to say that for more than a month his studies were very much neglected and interrupted, but he has now settled down to work again and we can see the improvement almost daily. The woman who is teaching him is under the supervision of one of the principals in the city schools who is a relative of Dr. X. They are working along original lines, taking up what seems to be of benefit. He is using more voluntary expressions every week, and a noticeable feature just now is that when we tell him to say a certain thing, instead of repeating it verbatim, he will express the idea in his own words. He reads a great deal and plays whist and other games aside from his studies. He has just finished transacting some business for the institution, the first which he has done of any importance since his illness."

I received a letter dated May 25, 1904, from a physician associated with this patient, which is so interesting in relation to this case as well as to the general subject of the treatment of aphasics by training, that I shall reproduce it in large part. After speaking of the doctor's steady improvement under the methods suggested and also of his own devising, the letter continues:

"Following out the suggestions you gave him, as well as an unusual originality in method which he has devised for himself, I believe the improvement will continue until the doctor will not be troubled to any appreciable extent at all. In order to give you a minute understanding of his present condition, I would like to call your attention to a few things, the import of which you will understand as soon as they are mentioned. In the first place, there has never been any particular affection of the memory. He recalls readily names, places, incidents of his past experience, and at times seems unusually capable in this respect, recalling and reminding others of the family of incidents which they themselves may have forgotten entirely. The word-blindness is improved considerably and is hard to detect unless special effort is made in this direction. The word-deafness, of course, is more pronounced than the word-blindness, as was the case when you examined him. His use of words to express an idea is much more general than has been the case heretofore. He now expresses in his own words answers to questions, in the form of a sentence rather than a single word; and it is noticeable that he is able to use a dif-

3. Wyllie, J.: The Disorders of Speech, Edinburgh, 1894.

4. The reader is referred for further notes on the training of this case to Dr. Weisenburg's remarks in the discussion.

ferent word to express the same idea. For instance, if we ask him, 'Do you feel cold?' he answers, 'Yes, I feel chilly.' Or, if we mention the sun's 'setting,' in answer he would say that the 'sun goes down about 7 o'clock,' or something to this effect. Formerly he used single verbs and nouns to express his ideas without putting them into the form of sentences, often leaving out the smaller words, such as the articles, 'a,' 'the' and 'and'; but he now uses these words without omission, and at times makes a sentence of considerable length. These sentences are formed of his own volition and are not simply a repetition from having some one else urge him to talk. There has been no particular difficulty in having him repeat sentences at dictation; but this feature of his case in which he originates his sentences is one of the points which shows a marked improvement, and this rapidly increasing vocabulary which he is now using is due, as I have intimated, to a natural tendency toward recovery, and the painstaking and conscientious use of a small dictionary, together with a thorough systematic schooling in the use of words by means of a blackboard, writing, speaking, etc., which we have endeavored to carry out to the fullest possible extent. It is remarkable to see the interest and enthusiasm with which the doctor himself appreciates the improvement in his condition, as well as the possibilities of the future. In carrying out the idea here referred to we have him do considerable reading aloud, afterwards repeating the sentences he has read without being allowed to see the book or the blackboard. In regard to number work and mathematics in general, it is much more difficult for the physician to make himself understood than is the case in the use of words. I would say at this point that I believe he had more of a natural talent for language than mathematics as a student, which somewhat accounts for the seeming difference between language and mathematics in his present work. It seems to be harder for him to express the numerals used in mathematics than to express the words used in speech. We also have him do a great deal of writing, urging him to write his own ideas rather than simply copy something which has been written by others. On account of the slowness with which he has to write it is hard for him to keep pace with what he is thinking about at the same time, so that here again we notice a disposition to leave out some of the words in forming his sentences. On the other hand, when he cannot immediately speak the word he has in mind, he is able to write it at once. Oftentimes when hesitating for a word, before he is willing to wait until he can express it in speech, he will spell the word on a book, or table, or any place convenient where he can make the word so that it can be read. He is being taught along the line of what is known in the schools as the 'word method,' instead of using each letter as in the older method of spelling. It is exceedingly interesting to observe the quick perception with which he grasps a new word that he has not thought of or come across before, when using this little dictionary. After this word has been brought to his attention, and especially pronounced by him and used in a sentence, that particular word is added to his vocabulary for good and he can use it in the future without any trouble. There is no doubt but that the zone affected is becoming smaller and smaller, or else that the right side of his brain is being educated to take the place to some extent of that part affected on the left. As, of course, you will readily appreciate, it is extremely difficult for me to know whether it is really a smaller portion of the zone affected which enables him to show these signs of improvement or whether it is the education of the opposite hemisphere which is taking up the function of that part of the brain affected."

In the first of these two interesting cases the methods pursued were in part the same, and in both they were much assisted by the native intelligence and the determination of the patients. In the case recorded in 1880, the patient largely followed his own methods; procedures such as naturally suggested themselves to one who has lost language and wishes to recover it. He began by the repetition of letters and words, and then by combinations of the latter. He read aloud, correcting himself and having others correct him. He copied words, phrases and sentences, keeping samples of his writing from time to time and sometimes securing the assistance and direction of others in correcting and improving what he had done or tried to do. The inability to name objects by sight, the so-called optic aphasia, was, as in so many cases of aphasia, one of his chief difficulties, and this he slowly corrected by repeating after others the names of objects held before him, and later by calling up the names of objects before him unassisted. This at first required much effort. Summarized then, his methods were chiefly as follows: 1. The repetition of letters, words, phrases and sentences, recognized by him in reading or repeated by him after others; 2. The repetition of the names of objects seen by him, or the naming spontaneously of such objects either seen or made known to him through his other senses, as for instance, by touching or handling; 3. Writing, either copy, from dictation or spontaneously, slowly and patiently improving himself in this respect.

The various pedagogic methods of treating aphasics can be summarized as follows:

1. The method of repetition after others which later becomes that of spontaneous recall as the patient improves; and allied or assisting methods like reading aloud, copying and writing from dictation.

2. Phonetic methods such as the method of the physiologic alphabet suggested by Wyllie and the use of phonetic readers.

3. The employment of vision to assist in the training as when the aphasic imitates the movements of articulation, enunciation and vocalization as made by others or by himself, in the latter case observing these in a mirror.

4. The re-training of the patients in the grammar of language when the aphasic is educated and when not, reorganizing so far as possible such language as he originally had.

5. Various special methods suggested by different authorities, as, for instance, that of Goldscheider of training the patient to repeat meaningless syllables.

With regard to the method of training by repetition many directions and many illustrations might be given. Those furnished by Dr. C. L. Dana[5] in a recent publication will answer as a basis for work of this kind, and I shall therefore, as they are brief, take the liberty of citing them fully. Such methods can be varied almost indefinitely.

1. Repeat five exclamatory words, such as: Ah, Oh, or another exclamation expressing joy, anger or other emotion.

Repeat after the teacher ten single monosyllabic nouns and pronouns.

Repeat ten polysyllabic nouns.

Repeat ten verbs.

In these latter exercises, each time a noun is named, let the patient see the object, feel it, and see the written or printed name of it on a piece of paper before him, thus stimulating his visual, auditory and tactile memories at the same time, as for example: Watch; pencil; pen; cane; box; book; and so on.

2. Repeat the letters of the alphabet, these letters being held in front of him.

Repeat the letters of the alphabet after writing and looking at each one.

Repeat the figures up to ten.

Repeat while looking at the written figures in front of him. Write and repeat these figures.

3. Repeat ten simple, qualifying adjectives, such as: White;

5. Studies from the Department of Neurology, Publications of Cornell University Medical College, N. Y., 1904, vol. I.

black; red; smooth; soft; rough. At the same time let him see the object and color, or feel the same.

4. Later let him try to repeat sentences of three words in which the noun is joined to the adjective, using the familiar nouns and the familiar adjectives already experimented with, thus: Pencil or pen is black; box is white; book is red; and so on.

5. If the patient ever had any musical capacity, have him sit at the piano and hum the notes of the piano, going through an octave, and then let him try to hum a tune, striking a note at the same time. Finally teach him to sing the tune through and then introduce the possible words. Some patients can sing before they can talk.

6. Copy sentences made up of the words he is being taught. Let him have an ordinary copy book and have the copy at the top of the page. Let him fill a page every day, trying at the same time to pronounce the words as he writes them. Have him copy first the familiar nouns, and then the simpler verbs, then the simple adjectives; finally let him copy sentences.

Take a small vocabulary and repeat from this, not trying to enlarge too soon.

7. Write the letters of the alphabet, and as he writes them, try to repeat them. Do this without a copy, if possible. Then let him write words to dictation, using the same vocabulary above referred to. Finally let him try to write short sentences to dictation, then try to read them after he has written them, with assistance at first, then without.

8. Write numbers up to twenty and say them out loud when written.

9. It would do no harm and might be of some benefit to try the effect of hypnotic suggestion in helping him to get along in these exercises.

10. The patient should allow himself to be read to for a short time twice a day, and he should also try himself to read a quarter of a page every day.

Much attention has been given by a few of the writers on the subject of aphasia and its treatment to the methods of re-education in language by phonetic methods such as the proper use of the vowel and consonant sounds and their combinations in particular ways. Undoubtedly a knowledge of the best method of producing and using special sounds and phonetic associations, will be of value in the restoration of speech lost by an adult, or even by a child, as it is in the primary education of a child. Wyllie gives a physiologic alphabet with a series of simple sentences illustrating its use, which I have reproduced.

In this physiologic alphabet the exact methods of forming and using both vowels and consonants need to be understood. A little practice, however, and the knowledge of the principles of the formation of these sounds, as described by Wyllie, will enable this to be done. He discusses at length the manner in which the consonant sounds are formed by the movements and positions of the lips, teeth and tongue. He especially considers the so-called stop positions resulting from placing the tip of the tongue at various points, as on the teeth, and anterior, middle and posterior locations as regards the roof of the mouth. In each of these positions certain sounds, labial, labio-dental, linguo-dental, anterior-linguo-palatal, and posterior linguo-palatal, are formed by the action of air passing through the oral cavity and outlets. Practice with the table and the illustrative sentences given in it, or with others which can easily be formed on the evident principles involved will soon familiarize one with the methods of its use even without an understanding of all the technicalities in the production of voice.

With regard to motor aphasia and the method of training by repetition and by the phonetic method, Wyllie says that it is often advantageous to have the patient repeat spoken words, and he holds that it is largely in this way that he reacquires his speech. He

A PHYSIOLOGICAL ALPHABET

I.—VOWELS.

y*—i e a o u—*w

These should be pronounced in the Latin manner, as *ee, eh, ah, oh, oo*; *y* and *w* are consonants, not vowels, but, as explained in the text, they have very close relationships to the vowels, initial *y* being very closely related to *i*, and initial *w* to *u*.

II.—CONSONANTS.

	Voiceless Oral Consonants.	Voiced Oral Consonants.	Voiced Nasal Resonants.
Labials.	P	B	M
(1st Stop Position.)	(W)	W	
Labio-Dentals.	F	V	
Linguo-Dentals.	Th[1]	Th[2]	
	S	Z	
Anterior	Sh	Zh	
Linguo-Palatals.	T	D	N
	(L)	L	
(2n Stop Position.)		R	
Posterior	K	G	Ng
Linguo-Palatals.	H or Ch	Y	
(3rd Stop Position.)		(R)	

The voiceless *W* and the voiceless *L* have been given above within brackets, the former being now almost confined to Scotland, and the latter being peculiar to Wales. The burring or uvular *R* is also given within brackets.

ILLUSTRATIVE SENTENCES

I.—VOWELS.

Even ancient elves are awed over oozing.

This sentence represents only long vowels. Their short equivalents can be represented, as shown by Mr. Pitman, by attaching the letter *t* to each vowel, thus:—

ĕĕt, it, et, at, ut, ot, o͝o͝t.

II.—CONSONANTS.

Labials. (1st Stop Position.)	Peter Brown made white wax.
Labio-Dentals.	Fipe villages.
Linguo-Dentals.	Thinkest thou so, zealot?
Anterior Linguo-Palatals. (2n Stop Position.)	She leisurely took down nine large roses.
Posterior Linguo-Palatals. (3rd Stop Position.)	Can Gilbert bring Loch Hourn youths?

believes, however, that the process can be much expedited by having the patient in the first instance master the simple letter sounds such as are explained in connection with the discussion of his physiologic alphabet.

He gives an interesting and detailed account of the treatment of a case of motor aphasia, the patient not being agraphic, in which complete recovery was obtained by the method of repetition and of training in the use of letter sounds.

A young man of twenty-five with mitral cardiac disease, had had an apoplectic attack which left him a hemiplegic and motor aphasic. He recovered the power of saying yes and no about four weeks after the attack. Two weeks later he had for the first time replied in writing to a question, using his left hand for the purpose. He continued to answer questions in writing, at first with some difficulty and awkwardly because he was not naturally left-handed. He could however, always recall the words he wished to use in writing. His hemiplegia in large part disappeared first from the leg and later from the arm.

He came under the observation of Dr. Wyllie four months after the attack causing the aphasia; at this time having a slight right-sided facial paresis and a marked paralysis in the distal portion of the right upper extremity, these being the remains of his former almost complete hemiplegia. His aphasia was still marked, almost his only utterances being yes and no. He improved, however, somewhat rapidly in acquiring single words which he often mispronounced, but what he did say whether the pronunciation was correct or not, was distinctly articulated. Tested with the physiologic alphabet he could not repeat many of the consonant sounds. He could produce the middle vowel sounds ah and oh, but had difficulty with the sounds at the ends of the list, often converting *ee* into *ch* and *oo* into *oh*. A full account is given of the consonant letter sound which he pronounced both correctly and incorrectly, showing considerable deficiency, this often being of a peculiar character. The tests were made with simple syllables containing the letter sounds. He expressed himself very much better in writing, but even in this respect showed considerable deterioration as was proved by comparing his writing before his aphasia with recent samples. He could read silently, but was easily fatigued in so doing.

This patient made an unusually rapid recovery attributed in large part by Dr. Wyllie to the use of the physiologic alphabet. As the main object of this paper is to call attention to practical methods of treating aphasics, I shall cite here from Wyllie what is said of the exact method in which he employed this alphabet:

"We did not trouble the patient with the names of the letters, but taught him from the beginning the letter sounds of the physiologic alphabet. In doing so, we adopted what may be called the 'Mother's Method.' Beginning with the labials, we taught him to say *papa, apap, appa,* thus giving him the consonant P as an initial, a terminal and a mid-letter. Then we taught him to say *baba, abab, abba*; then *mama, amam, amma;* then wee wee; and so on throughout the alphabet. He was shown by 'lip-reading' how to place the lips, tongue, etc., for the pronunciation of each letter-sound."

He was then supplied with primers in which to study short sentences, gradually increasing their length, and in various ways he also practised speaking. Eight months after his apoplectic seizure he was able to articulate almost anything he wished to say, but it was necessary to do this slowly and carefully. His powers of writing which were always relatively good, were restored.

At my request Dr. T. H. Weisenburg has examined the recent German literature of the subject of the training of aphasics and as a part of the discussion of this paper we shall give especially the methods of Goldscheider[6] and of Gutzmann.

Summarized, the methods of these German neurologists are much the same as have been indicated in discussing those pursued by Wyllie and by me. They have, however, some points of special value and a few of some originality. The methods used are those of the repetition, not only of letters, words and phrases, but somewhat after the manner embodied in the physiologic alphabet of Wyllie, the repetition of sounds in particular letter or syllable associations, combining vowels, for instance, with the labials, dentals and other consonants. Tongue exercises are practiced; tones are taught; the patient is made to imitate movements of articulation and enunciation by watching the facial movements of others, and to improve himself in the same respects by observing in a looking glass his own movements and expression in articulating; the association of vocalization with reading and writing as well as with speech is practiced, in other words, the patient learns to read aloud and also to repeat what he writes; geometric forms are taught; and the aphasic writes from dictation, from copy or spontaneously; words are associated, not only with their meanings, but a suggestion is made to repeat meaningless syllables in various combinations. The association of names with concrete objects is brought about by one of the well known methods of repeating the names of objects seen, handled or recognized through any of the senses.

Gutzmann teaches that sensory aphasia is more difficult to treat than motor aphasia, a statement with which I do not entirely agree. He recommends that the speech movements should be observed and fully remembered. It is well known that the words of a singer can be told by watching his expression and the movements of his mouth. Feeling the different vocal organs as the larynx, the lips and the cheeks, while one is speaking is of value. The education of the sensory aphasic is that of a child. An object is held in front of him, the name is told, a picture is shown, and the word is pronounced, spelled and written. Sometimes when a patient is able to read the meaning of the words from a speaker's lips, he is unable to derive their meaning from the written words. In such a case a better way is to write the words while observing the lips. Gutzmann has what he calls a "phonetic picture script (alphabet)" where the letters are indicated by the pictures of the lips, cheeks and the expression of the face.

With regard to the treatment of auditory aphasia, Wyllie cites approvingly the plan used by Schmidt in an interesting case of pure auditory aphasia recorded by the latter. In this case words were deliberately spoken to the patient and she was asked also to read aloud printed words, she not being word blind. At first she repeated with difficulty. Wyllie suggests that "probably the practice was imprinting the word-images efficiently in the uneducated auditory center, and at the same time establishing connections of the requisite intimacy, between these images and those of other speech centers."

It became a matter of interest to me in observing aphasics who were striving to recover their lost powers, to note the particular parts of speech which were most obscured and most difficult to regain, and also the particular difficulties which attended their reacquirement or prevented this. A patient who has so nearly lost language that he has only one or two recurring utterances, regains by repetition, and recall, word after word, especially nouns. Later a few verbs are acquired. Adjectives, adverbs, prepositions and ar-

6. Goldscheider, A.: Handbuch der physikalischen Therapie, part 2, vol. ii, Leipz., 1902; Gutzmann, H.: Arch. f. Psych., vol. xxviii.

ticles, the parts of speech whose uses are to modify, limit, or express relation are so entirely lost to the patient as to cause, more than anything else, his difficulty in language. The same remark applies to conjunctions like *and* and *but*, and with a special force to the auxiliary verbs in all their modes and tenses. The meaning and use of such words or combinations of words as, *is* and *was* and *has been* are in eclipse or lost to a varying extent. The impairment or loss of the faculty of constructing sentences, or propositionizing in language is one of the most important, if not the fundamental defect. While thought is at times expressed by a single word, the sentence is the usual unit of thought expression, and the aphasic patient, or at least some aphasic patients, find their chief difficulty in regaining those parts of speech which are concerned with qualifying and correlating. The grammar of language no longer exists for them.

Considerations of this kind led me to the use of primers and grammars in the retraining of aphasics; and these with individuals previously reasonably educated are of great value. Patients should be taught the grammar as a child is instructed, in other words, by teaching him the meaning of the different parts of speech and the exact methods of using them in phrases and sentences. The significance and value of the qualifying, relating and conjoining parts of speech should be enforced by numerous examples. When the aphasic in his efforts to repeat after another or to respond to what another asks or indicates, uses incomplete sentences, the complete sentences should be given and explained. In every possible way the manner of using adjectives, prepositions, conjunctions and auxiliaries should be impressed. The patient with the book before him should be taught to conjugate verbs, decline nouns and pronouns, compare adjectives, and in other ways to go through the routine methods of studying language employed in the schools, these being modified by the particular requirements of the case. The dictionary can often be used as a valuable adjunct to the grammar, some patients taking a particular interest not only in reacquiring words in this way, but in thus learning their meaning and their uses as parts of speech.

A few words should be said about the general management of aphasics while attempts at their re-education are being made. It should not be forgotten that, owing to the impairment of their powers of communication with their fellows, they often tend to become irritable or emotional under strain, or even at times with little or no cause, although this is by no means without exceptions, as I have seen a number of instances in which the deprivation of language has been borne with patience. The instructor should be both patient and considerate. The aphasic should not be pressed too hard in the process of re-education. If the aphasia is of comparatively recent date, not improbably some dangers may be apprehended from too insistent methods of training. The limitations of each patient should be studied, and the crippled brain should not be exhausted and irritated by too prolonged sittings. Patients suffering from word deafness who are beginning to recover their cerebral hearing are at first easily exhausted and may become discouraged in this way, and the same is true, but probably to a less extent, of cases of pure motor aphasia. If the patient is given lessons in the repetition of letters, words or sentences, in reading aloud, in writing from copy or dictation, in the physiologic alphabet, in naming objects at sight, in the study of words in a dictionary or of parts of speech in a language primer or grammar; in whatever way the training is pursued, and whatever stage it has reached, the patient's powers of endurance and of further developments should be carefully studied and should be the main guide as to each succeeding stage.

When language is reacquired by an aphasic, how is this brought about? The answer to this question is not always easy. The basis of reacquirement may differ, and for several reasons: 1, Because of the difference in the original capacity and previous education of the aphasic; 2, because of the form of the aphasia; 3, because of the degree of destruction of the centers or tracts in the zone of language.

Everyone with experience among aphasics has noticed the difference in the time and in the completeness of the recovery in cases apparently equal in the original loss. This remark applies not only to those cases in which aphasia is the only symptom, but to the more numerous classes in which hemiplegia or hemiparesis is associated with the aphasia. A man of intelligence or education, or of both, and especially if he is endowed with a strong character, will often advance with great rapidity on the road to recovery. The previous business or mode of life of the individual, in persons of equal degrees of education, may also have much influence on recovery. One needs, indeed, only to recall and compare his hospital experience with his experience in private practice to appreciate the full force of these statements. In the nervous wards of the Philadelphia Hospital, where a number of aphasics of different types are always to be found, the majority of the patients have little or no education. Among these patients recoveries from aphasia are comparatively rare and are relatively incomplete, while better cared for private patients show much greater improvement and approach more nearly to complete recoveries when properly and persistently trained.

With regard to the type of aphasia, my personal experience, like that of others, has varied. Usually cases of pure sensory aphasia make rather rapid partial recoveries, at least this is true of cases with word deafness. Where sensorimotor aphasia is present associated with hemiplegia, the recovery from the aphasia is usually partial. It would seem probable that in many cases destruction of the cerebral areas for speech is incomplete, in these cases language being partially reacquired by calling into activity the unimpaired portions of these regions. The centers in the right hemisphere have a potentiality for speech which can be developed under necessity, but it is doubtless true, as Bramwell and others have pointed out, that the ability of the right hemicerebrum to take on the function of speech differs greatly in different persons.

In further illustration of some of the points given with regard to the training of aphasics, I would like to call attention to two patients who have been trained under my direction, in large part by Dr. T. H. Weisenburg, and who have made great improvement under the systematic efforts employed:[7]

The patient was a young man, painter by occupation, who had no history of syphilis, but had indulged in alcohol not infrequently to excess since the age of 15. When he was admitted to my wards at the Philadelphia Hospital, Dr. Weisenburg was the interne, and took charge of his training under

7. These patients were presented at the meeting of the section and a demonstration made of their improved ability in talking, reading and writing.

my direction. So far as his speech was concerned he was a typical instance of motor aphasia. He had no spontaneous vocabulary except the words yes or no, and his name, or a part of it, usually speaking of himself by his first name only. He could repeat single words if he took his time, but was easily confused. He could not read, although he was able to do so before his illness. He answered questions fairly well by pantomime. If given a start he could count from one to eleven, but forgot easily. He could not read aloud either script or text, although he seemed to understand them by sight. He was not word deaf. When he attempted to repeat what was said to him he did much the best as regards nouns and next as to verbs, but was unable to repeat a complete sentence, even a short one, by repetition. Besides his aphasia he suffered from a typical form of Jacksonian epilepsy. The spasm always began in the right side of the face, and sometimes extended to the right arm and even to the right leg. The initial phenomenon was always facial. The spasms frequently recurred. The eye examination showed no optic neuritis.

The training was confined to the method of repeating words from dictation and by having them pointed out in reading and writing, and to the method of Wyllie's physiologic alphabet. The man made slow but continuous improvement, until he left the hospital a few months after admission. During this time also the spasms practically ceased, the last seizures occurring at intervals of several weeks. When he left the hospital he continued to carry on his re-education at home, using a primer, and with the assistance of members of his family, re-studying the meaning and pronunciation of words and combinations of words.

He gradually improved till he could communicate spontaneously with others, but in a slow and halting manner, marked by the elision of a considerable number of words from sentences. Even the most careless study of the re-acquired language showed that the words chiefly at his command were, in the first place, nouns expressing the abstract; next, those of a concrete kind; next, verbs, and perhaps next pronouns. He very seldom put a sentence together unless it was a short one.

It is now about four years since this man was first attacked with his aphasia and Jacksonian spasms. Since he has left the hospital he has not had any recurrence of the convulsions. He has been able to earn money in various employments, as by peddling.

It is not improbable that a considerable part of his improvement has resulted from the use of iodids, although the method in which the case occurred would not seem to point to gummatous meningitis, but rather to a sudden hemorrhage localized to the left subfrontal convolution chiefly, perhaps invading slightly the lower extremity of the precentral gyre.

This patient can now communicate with others in an intelligible manner, although his sentences are incomplete. He can read aloud from a primer, and even from a book or paper sentences which are not too elaborate. He has made, in short, a degree of improvement commensurate with his original capacity and education, but not nearly so great as that of the highly educated physician recorded in this paper.

The second case is of so much interest in the study of aphasia that it is worthy of publication for its own sake, as well as to emphasize what can be gained by persistent training over a short period in cases of sensory or mixed aphasia.

The patient was a hotel keeper, aged 44. He was entirely well until November, 1903, when, after worry and hurry home, he was suddenly taken with severe headache and dizziness, but did not become unconscious and had no aphasia nor other objective symptoms.

After this, once or twice weekly he experienced severe attacks of headache, and on two or three occasions between November and February had attacks with dizziness. About the middle of February he had a sudden attack, in which he first called out, "Oh, my right arm," and very soon afterward became unconscious, remaining in this state for three days, with congested face and disturbed breathing. When he regained consciousness he was totally unable to speak except in jargon fashion, and could not understand a word that was said to him for a week. He was not, however, paralyzed in arm or leg, although he had difficulty in standing and in using his right arm. He could not carry it with precision to the place intended, as for instance, to his shoulder. Surely and gradually he re-acquired, although by no means fully, the power of speaking spontaneously or in response in conversation, using less and less of the jargon.

After his attack in February he had never been able to read the newspapers or anything else, as formerly, although evidently anxious to do this, as shown by his frequent efforts. It is interesting to note that he could read every word in the books in which he kept his accounts.

In testing him for his powers of word-seeing, letter-seeing and number-seeing, it was evident that he recognized some letters and some words much better than others. This was especially true with regard to words. He could always pick out words which had evidently been unusually familiar to him before his seizure; for example, the words whisky, brandy and beer in the hospital diet list were at once recognized, although most other words he could not tell, except in a few cases with difficulty. He showed curious variations in his ability to recognize words and letters, as when, for instance, he could spell out the word head, pronouncing all the letters except the d; sometimes he recognized a word without correlating it with its meaning. He had not only a well-known form of optic aphasia, that is, inability to indicate by name the object seen, but what might have been regarded the reverse of this, the inability to translate into meaning the word which he recognized. Sometimes when asked to spell an easy word, he did so correctly, and then would not be able to find the word in a page in which it was printed, although perhaps on the same page and nearby he would recognize another word of about the same simplicity. It happened at times that he could recognize a word on a page at one minute and a little later would be totally unable to do this. He made some curious mistakes in recognizing, or failing to recognize, parts of speech, as when he picked out *an* when asked to indicate *the*, although the latter word occurred several times on the page. Looking at *an* he would spell it out as if it were *the*.

Letters in a word like words on a page or in a paragraph were sometimes correctly recognized and sometimes not. He picked out some numbers on a calendar, and when asked to indicate other numbers he sometimes became confused. In some instances he would get at the number by starting with the units or numerals before the number and working up to it, as, for instance, when asked to indicate 15, he pointed to it and said, 12, 13, 14, 15.

It was noticeable in this man's case that if he were allowed to have his own way in talking spontaneously he apparently had very little difficulty in using language; for instance, when he was asked to count out money values he took notes of different value and various coins from his pocket, counted their number and talked about them almost as anyone else would.

Word deafness was a marked feature in the history of this case. At first, from what could be learned from members of his family, this was total. He had, however, slowly regained the power of recognizing some words and later some expressions, the improvement in this respect proceeding slowly when he came under my observation. In listening to others he was aided in his understanding of what was said by watching the facial expression and movements of the lips. I made frequent tests of his word deafness and found that it was partial and seemed to vary much from time to time. Another point of great interest was the fact that his word hearing powers were soon exhausted by efforts to communi-

cate with him. He would become confused and sometimes unable to comprehend what was said to him if the conversation were continued too long. He also became extremely confused if more than one person attempted to talk to him at the same time, or if a miscellaneous conversation were going on in his presence.

The patient stated that before he had the first attack in November, his hearing was different on the two sides. He heard better with his left ear than with his right; when he was a locomotive engineer he had often noticed this. Examination of his hearing with the watch tick showed on the right aërial conduction at 7 inches, and good bone conduction; on the left hearing was acute, hearing the watch tick at 41 or 42 inches; bone conduction was also good on the left. Such deafness as he had, except that noted for the right ear, was evidently cerebral and not peripheral.

With regard to his appreciation of tones and music, his daughter said that on several occasions during the first months after the apoplectic attack when she was playing the piano her father said that all music sounded alike to him. His wife also stated that he said to her on one occasion when he heard music, "It all sounds the same to me." Lately he had not said much about recognizing music. While at my office the patient's daughter played two or three familiar tunes, which he evidently recognized, and one of which he was able to hum in unison with the piano, but he could not recall the name of the song, although he said he knew well what it was; neither could he recall the words.

Careful examination of this man for reflexes, motor paralysis and hemianopsia was negative. Sensation in all its forms was retained, as was also stereognostic perceptions; he had, however, partial tactile amnesia as well as partial optic aphasia, not being able to name objects either through touch, manipulation or sight.

In brief, this patient was originally a total aphasic, the lesion being on the sensory side of his cerebral zone of language, probably near the position where the higher visual and higher auditory centers are coterminus, that is, about the caudal extremities of the first and second temporal convolutions. His early motor aphasia was simply due to the great general disturbance of his zone of language; his amusia also probably resulted from similar disturbance or from pressure rather than from direct lesion, as he recovered from this at a comparatively early period. Word hearing, word seeing, letter seeing and number seeing were the fundamental cerebral functions lost as the result of the destructive lesion. His partial recovery up to the time he came under observation was probably due largely to the recovery of power in those parts of the left cerebral hemisphere uninjured. The right hemisphere was also probably beginning to respond to the efforts at re-education, which he had pursued in an irregular manner spontaneously and with the assistance of those around him.

During a stay of less than a month in the Hospital of the University of Pennsylvania under a course of training which included some of the features of most of the different suggestions made in this paper, he made rapid progress, gaining steadily in his ability to understand spoken words, reading and writing and to carry on both responsive and spontaneous conversation. Although a man of quick perceptions and ready wit, he was not well educated. He had, however, been a fluent talker, and was able to write with fair correctness before his attack. He lost this power entirely, but is recovering it with considerable rapidity.

The following are two samples of his writing, the first made about three months after his apoplectic attack, and the second a few days later:

"Anie you to talk to last night me yhy did anie how long at this round time you whar is Chas Frindt did he work to fesh to me yet Anie did you teel about Dutch Rimling is he drink to fr him Anie you tell that to woking to me all to mutch calt whar is mind ducks thim ded or what happened."

"1904

Pheliaphet May 16,

Emma i will com from you at the Rehrig rail rod will com from 12.20 Right dont tell about the Boyes i will sneep Back on the holl Bor i haas mie things."

It must be remembered in passing a judgment on the man's improvement, as indicated by the above specimens of his writings, that he could not read or write a word a short time, probably only about three or four weeks, before the date of the first of these productions.

DISCUSSION.

DR. T. H. WEISENBURG, Philadelphia, stated that, under the direction of Dr. Mills, he trained three of the aphasics referred to in the paper. The principle of the methods employed was essentially the same in all the cases, but there was a wide difference in their application. In the first patient, a pure motor aphasic, Wyllie's physiologic alphabet proved of the greatest value, with the additional practice in letter and word writing and reading. The patient was sufficiently instructed in a short time to be able to carry on his studies by himself. Dr. Weisenburg did not see him afterward for over two years, when he told him that he was earning his living by street peddling, and that while selling his wares he could talk with but little hesitation. He still has difficulty in talking, but in view of the fact that he could say nothing but "yes, yes" when instruction was begun, the improvement is remarkable. This patient was young, fairly intelligent, and possessed of the greatest amount of determination. This last point is a very important factor in the prognosis. Dr. Weisenburg said that the second patient referred to by Dr. Mills was a sensory motor aphasic. A highly intellectual man, imbued with the determination to speak, he spent nearly all his time in study. The training was begun by a systematic instruction in sounds, first the vowels, then the consonants; the proper positions and relations of the mouth, tongue and lips were insisted on. After this point was firmly impressed on him and mastered by him, the improvement was rapid. Newspapers were read by another person, the patient following, all misunderstood words being explained by the use of a dictionary. Writing with the left hand, playing with pictorial cards, the reading of illustrated sentences, and drawing of geometrical figures were practiced and proved to be of the greatest benefit. Grammatical constructions were taught. The improvement was rapid. The third patient was a pure sensory aphasic, with little education and with much less intelligence and determination than the preceding patient. Here the training was difficult and consisted mainly in the repetition of letters, words and sentences, and the constant rewriting of the same; nevertheless, the improvement was considerable. Dr. Weisenburg said that from the experience he has gained, especially from these cases, that the method of training will largely depend on the form of the aphasia, and that most patients will be benefited if properly instructed. The mixed form is probably the hardest type to teach, although less progress was made for the time spent on the patient with pure sensory aphasia than on the others. The following brief résumé of the methods employed in training aphasics is taken from the Handbuch der physikalischen Therapie, Part 2, Vol. II, Leipzig, 1902:

Goldscheider insists that in the training of aphasics the mere repetition of words is not enough and that a systematic instruction is necessary. A beginning should be made by the simplest instruction of sounds as by the letters and short syllables. Gutzmann recommends a beginning with vowels, next the explosives and then to the first articulation P. The explosives are bound with the vowels, as Pa, Po, Pe, Ba, etc. Then come the nasal consonants, N and F and W, and so on in the list of consonants.

If the patient can not repeat sounds as they are he should be instructed to watch the mouth of the speaker and to try and imitate the sound thereby. If the patient is then sufficiently instructed he should next be taught articulation. Gutzmann also thinks that the comprehension of optic perception of speech movements can be greatly benefited by the patient watching articulatory movements in the looking glass, comparing this with illustrations at hand.

Goldscheider believes that systematic tongue exercises are of benefit, as the patient learns how to control accurately tongue movements.

If the aphasic has progressed sufficiently in the repetition and understanding of simple sounds, he should learn how to repeat sounds in a systematic manner, and by himself. This should not be always according to the alphabet, but should be changed. If the intelligence and the perception of the patient is sufficient, he should next be taught the different tones.

Further on, after the patient has learned to associate vocal sounds with speech movements, he should learn how to associate these with other perceptions, as writing and reading. This should consist in the copying of words, writing by dictation, or automatically. If there is paralysis of the right hand, the left hand should be instructed. The instruction should be systematic, as letters, syllables, words, sentences, etc. If there is optic aphasia, the patient should be instructed for forms as letters, as, for instance, he should be shown a letter from the alphabet, and should be made to remember it and to be able to point it out. Geometric perception should be taught, as this will help optic perception. Matches can be taken and figures built and the patient should reproduce them, or should do so by memory.

A number of aphasics are unable to read words, though they are able to perceive the letters of the word. These should spell a word loudly and be allowed to pick words from the alphabet, and should repeat the word until known.

It is also well known that a word can be better remembered, for instance, if impressed on more than one sense. So, a word heard should be repeated, written down, spelled, and so on. A patient should never be instructed for a long period at one time, and, again, should not entirely depend on the teacher, but should learn enough to write, spell, computate and observe movements in the glass by himself.

Next, the patient should be taught to repeat and remember short words. This should be done in a systematic manner and the words impressed by reading, writing and spelling.

Ruger aids optic and acoustic perception by aid of fingers. Each finger is made to signify certain words or numbers, and as each number is called the finger is projected, and so forth.

The association of words with their meaning is now the next point to be desired. This can be accomplished in various ways, notably by holding an object in front of him, telling him what it is, making him repeat the word and asking him to spell it, and to pick it out by alphabet, until it is thoroughly impressed on his memory.

It is to be remembered that in aphasics the words for abstract objects and for the pure formal speech elements are in a large measure better controlled than for concrete objects. Therefore, the teaching of this is highly important.

To instruct the tones and accents of the words is very important. This is helped by declensions and conjugations very materially. A better way is for the patient to learn certain sentences, paragraphs, sayings, and to learn to repeat them properly, and also to be able to write them and to read them loudly. Goldscheider thinks that the best way is to memorize rows of meaningless syllables, the order of these being changed from time to time. By this method the patient learns to differentiate syllables, accents and tones, and learns to remember different shades of sounds. It is well known that it is more difficult to remember meaningless words than words with meaning, and that it is harder to remember words spoken than the meaning of them. Herein lies the value of this training.

The syllables ut, re, mi, etc., are taken and arranged in rows as shown below; the combinations may be changed indefinitely:

ut	re	ut	re	mi
ut	mi	ut	mi	re
re	ut	re	ut	mi
re	mi	re	mi	ut
mi	ut	mi	ut	re
mi	re	mi	re	ut

DR. C. W. BURR, Philadelphia, said that the first case was a patient of his before he was a patient of Dr. Mills, so that he is able to certify and to state that there has been a very great amount of improvement in his speech since he saw him at that time. Dr. Burr considers that, so far as speech is concerned, these patients are in a state of childhood, and it seems to him that the only way to teach them is to proceed as if teaching a child. Show the object, call the object by a certain name; write down the name of the object, let the patients draw pictures of it, and they will gradually learn what the object is. Dr. Burr does not think it a good thing to make them repeat monosyllables in order to educate the auditory centers, notwithstanding that high authorities approve that method. He believes it is much better to educate them in sounds that mean something—boy, bell, book, and so on. Dr. Burr said that it is very hard for us to say how much of the improvement is due to education and how much is due to the natural course of events. In a case of syphilitic brain disease, a case of this character, from the pure use of mercury, independently of instruction, may regain largely the powers of speech and writing. Unless specific disease can be excluded, it seems to Dr. Burr possible that some of the improvement is due, not to the training, but to improvement in the specific disease.

DR. W. G. SPILLER, Philadelphia, said that there are four factors to be considered in regard to the prognosis: Age; nature of the lesion; extent of the lesion; intelligence of the patient. He has never seen an adult who was aphasic, although there might be hemiplegia on the right side, provided the hemiplegia developed very early in life. At one time he examined 30 cases of hemiplegia developing in early childhood without finding any case of aphasia accompanied by right-sided hemiplegia. In cases where the lesions are in a limited portion of the speech area, there will be improvement in the natural course of events. Traumatic lesions, Dr. Spiller says, give better results, so far as aphasia is concerned, than hemorrhage into the brain or thrombosis of blood vessels. Seven years ago Dr. Spiller examined a man with distinct motor aphasia who has now entirely recovered. The aphasia was caused by an injury received on the head. Another interesting case was that of a man who received a blow on the head and had word deafness as a result. He was found to have a large cyst in the left temporal lobe. This man, by his own efforts, recovered partially from his word deafness. In a case due to trauma the aphasia may last a short time; if due to arteriosclerosis it may be of considerable duration.

DR. JOHN PUNTON, Kansas City, Mo., agreed with Dr. Mills that if complete success is desired attention must be paid to the co-ordination of the speech. Complete success is often impossible; patients never recover completely, and Dr. Punton does not believe physicians are warranted in holding out a prognosis of complete success in that sense. It seems to him that the nature of the lesion in the case should have something to do with the prognosis, as Dr. Spiller has said. In a large number of cases there is embolism and thrombosis, and whether their presence would have anything to do in determining a second attack. It seems to him that the extreme efforts the patient would put forth in trying to accomplish his end would have a tendency to induce a second attack. That is one of the things that text-books warn against.

DR. F. W. LANGDON, Cincinnati, Ohio, stated that erroneous ideas prevail in the profession on the subject of the function of Broca's or the third frontal convolution. It is not a motor speech center, and its destruction gives rise, so far as can be seen, to no defect of motion whatever. Dr. Langdon prefers to speak of it as a language construction center, where the words are thrown together in their proper relation, but the real motor center is the lower Rolandic region, where the movements of the face, tongue, lips and so on are directed. Dr. Langdon said that he does not consider that grammar has anything to do with the acquirement or reacquirement of language by a patient with motor aphasia. The acquirement of language and grammar is purely a memory process. The child raised in refined surroundings will acquire a very different language from that of a child raised in the slums; and with a child raised in the slums the language of the slums will occasionally crop out, in spite of education and grammatical training. Language must be looked on as a matter of pure memory and arrangement, independent of grammatical relation.

DR. C. W. BURR, Philadelphia, said that he did not mean that in a man whose brain was occluded through the obstruction of an artery due to syphilitic disease iodid of potassium would dissolve that softening and create a new brain, and hence bring about restoration of function. He meant that in syphilis there may be syphilitic arthritis, not sufficient to produce softening of the brain, but quite sufficient to interfere with the function and to produce aphasia which, under the administration of mercury and iodid, certainly does clear up.

DR. W. J. HERDMAN, Ann Arbor, said that this whole matter can be summed up in the simple statement that while educational methods are the best to employ when there is any capacity left after injuries or organic disease of the different sorts, yet it is this capacity for recovery that is really the condition which determines how far the recovery will take place. There are some cases in which one would not by any process of education expect any degree of improvement. There are other cases which do possess such a capacity for improvement, and the individual will no doubt, without any very great help, show progress for the better, but it is the physician's business to employ therapeutic measures so far as they are helpful. Whether it is called a "grammatical process" or not, there is no question that the aphasic, if he retains any capacity in language, retains the vertebræ of that language, and in order to make it more ornate and intelligible he must, of course, place on the vertebræ the soft parts. Dr. Herdman does not agre with Dr. Langdon that the instruction of the aphasic must proceed along the same lines as the instruction of a child. The whole possibility of development in an aphasic depends on what remains of what actually did exist there, and in arousing this into action again. If the capacity never existed it could hardly be expected that the patient could be educated beyond the stage of his former acquirements; if the capacity does, or did exist, then the process of a systematic attempt at education is exceedingly helpful.

DR. CHRISTOPHER C. HERSMAN, Pittsburg, said that it is true that language is used in spite of grammar, and that after language has been learned it is perfected by grammar. If the patient is word blind and has to be taught words, he also needs synthetic teaching, or instruction in synthesis, building up, as well as teaching the individual words, and while teaching him the words, if the construction is also taught, more thorough advance is made than by simply teaching him the words.

DR. CHARLES K. MILLS said that the method of re-educating the aphasic is not exactly that which is applicable to children. The aphasic has both an advantage and a disadvantage as compared with the child. His advantage over the child is that his brain was thoroughly organized and in some cases thoroughly educated before the occurrence of the lesion; his disadvantage is that the child in its education started out with a potential mechanism of speech not affected by disease. Dr. Mills, of course, has taken the nature and extent of the lesion into consideration. He has seen cases of gummatous meningitis with aphasia and without other symptoms, the aphasia disappearing under the action of iodid. The first patient may have had a specific infection, but there was something more, a destructive lesion of the language center, and it is for this that he requires re-education. Dr. Mills has seen uremic aphasia and aphasia due to all sorts of affections which are remedied and do remedy themselves in time, but the remarks here apply to cases not to be restored to speech by time or medication. Dr. Mills stated that one inference drawn from part of the discussion is that these patients would get well anyhow by the progress of time in proportion to their natural, plus their acquired capacity, before the aphasia; but this is not quite true, as he knows from a long experience. He used the term grammar in a rather broad sense, in order easily to convey his idea. The patient must be restrained in the use of language as he formerly used it. There is a grammer of the slums. If a child who lives in the Bowery and uses the language of Jimmie Fadden becomes aphasic, he must regain this particular sort of language. The method of training must not be simply a method of memory. The patient must learn again the use of prepositions, adjectives, conjunctions, and auxiliaries, of all the parts of speech that go to make up sentences, and the methods of arranging these in sentences for the expression of thought.

THE CONTROL OF INTERNAL HEMORRHAGE BY DRUGS.*

THOMAS LUTHER COLEY, A.B., M.D.
Visiting Physician to the Methodist Episcopal Hospital.
PHILADELPHIA.

By the term internal hemorrhage, as used in this paper, I include all forms of bleeding in which the bleeding point is not within reach of direct topical application.

It will be my purpose to set forth the general principles on which rational medical treatment is based, and not to discuss the relative merits of surgical and medical means.

In the first place, it may be stated that we have no specific remedy for the control of bleeding, and secondly that the employment of many of the drugs recommended is not based on rational grounds. As will be seen presently various agents are advised for a similar condition which act antagonistically, so that if one does good, the other must do harm.

The preference given to many remedies by clinicians is too often based on insufficient data. The action on a small series of cases of certain character may not apply to all hemorrhagic conditions, and the tendency of the bleeding to cease from nature's efforts is so important a factor that we are never sure our drugs have exercised any influence whatever.

In order to discuss intelligently the control of internal hemorrhage, I shall state the following general principles:

1. The mere onset of hemorrhage does not necessarily indicate medical treatment. The general tendency of bleeding is to cease from natural causes, and often more harm than good is done by overdrugging.

2. All patients, bleeding from whatever cause, must be kept in a state of absolute rest and quiet, bodily and mental, so far as this is possible.

3. All forms of hemorrhage may be more or less benefited by what may be termed collateral treatment. Change of bodily posture as indicated, drawing the flow away from the bleeding point as much as possible, the use of cold, heat, counter irritation, ligature of the limbs, etc.

4. The drug treatment of hemorrhage includes:

A. First, the use of hemostatics, acting locally when this action may be secured, as in certain forms of bleeding in the gastro-intestinal tract. Second, the use of internal hemostatics.

B. First, the use of drugs for the purpose of lowering the blood pressure, by depressing the heart or widening the blood paths. Second, the use of drugs to produce a local constriction of the vessels around the bleeding point.

In the consideration of the action of drugs on the vasomotor system we face one of the great difficulties of our problem. Vasoconstrictors to be of value must possess an affinity for the vessels around the bleeding

---

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Pharmacology, and approved for publication by the Executive Committee: Drs. G. F. Butler, Solomon Solis-Cohen and O. T. Osborne.

point and there alone; otherwise a rise of general blood pressure will more than compensate the constricting action. The local constriction of the bleeding vessels may be brought about relatively by those vasodilators which act on the vessels of the general circulation, but do not dilate those of the bleeding area. The difficulties of the problem are obvious. Sollmann discusses briefly the selective action of dilators and constrictors, a knowledge of which is of paramount importance.

"The lungs are not much influenced by vasomotors. Hence dilatation would be indicated: Nitrites.

"The vessels leading to the brain are very subject to dilators, but not to constrictors. Neither measure would therefore be useful. If there is not naturally a showing, aconite would promise good results.

"The splanchnic area is the area most sensitive to vasomotor influence, and which reacts most promptly to either dilators or constrictors. The latter would be indicated: Strychnin or hydrastis.

"The skeletal muscles are not readily dilated nor constricted. Dilatation would be indicated: Nitrites.

"The uterus is strongly subject to constrictors. In postpartum hemorrhage, ergot; in menorrhea, hydrastis and especially local treatment."

These general postulates urge me to controvert the internal use of all drugs producing a rise of general blood pressure, either directly as digitalis, or indirectly as the emetics, ipecac, etc., with the exceptions of ergot and hydrastis in bleeding from the uterus, and possibly in hemorrhages of the splanchnic area.

With these preliminary remarks I shall proceed to outline briefly the general action of some of the remedies advised as internal hemostatics. This will illustrate how widely at variance have been the views of clinicians as to the therapeutic indication in cases of bleeding as well as the lack of knowledge of drug action.

VEGETABLE AND MINERAL ASTRINGENTS.

Astringents of both classes have a distinct constricting action on tissues. They precipitate albumin and other proteids and are effective only when applied locally. The vegetable astringents owe their activity largely to their tannin content. Tannic acid is itself derived from the oak gall and seems to consist of an anhydrid combination of gallic acid (Cushny). The greater part of the tannic acid administered is decomposed in the intestine into gallic acid. Hamamelis, gallic and tannic acid are alone of interest to us in this group.

Despite the fact that these remedies are administered routinely for the control of internal hemorrhages there is no satisfactory evidence, whatever, that they are of any value. Tannic acid is found in the tissues in minute quantities as a gallate or tannate of soda and the traces are so minute that they can have no action.

The mineral astringents, notably the salts of lead and iron, are very commonly prescribed for their supposed internal hemostatic action. They are, however, valueless for this purpose, being absorbed in very minute quantities and having no predilection for the bleeding point. If they were capable of coagulating the blood after absorption and thus stopping hemorrhage they would certainly do so in the portal circulation and would not be carried to the bleeding point before they acted. . . . They never reach the blood except in forms in which they have no astringent nor styptic action (Cushny).

SUPRARENAL EXTRACT.

The local effect on the vessels of preparations of the suprarenal glands is most marked and they have the added value of not producing a rise of general blood pressure when locally applied. The extract has been used with satisfactory results in gastric hemorrhage and it may be injected into the uterus, rectum and bladder, but it is only useful where a local application can be made. There is no satisfactory testimony that the bleeding point can be reached through the circulation. Experimentally it has been determined that when a small amount of epinephrin is injected into the blood vessels of animals that there is a very rapid rise of blood pressure with a slow heart beat; further, it has a distinctly selective action, some of the vessels being affected very much more than others. In the organs whose flow of blood is regulated by the splanchnics the effect is most marked while the vessels of the lung and brain do not seem to be affected; those of the skin are much contracted, and those of the muscles scarcely influenced. The rise of blood pressure following the intravenous use of epinephrin (which is a very unstable product) would be a contraindication to its use in internal hemorrhage.

DIGITALIS.

Digitalis is sometimes prescribed to stop hemorrhage, but the flow of blood is increased through the contracted arteries and there is no evidence but that more harm than good would accrue from the administration of large doses of the drug.

ERGOT.

Ergot, on account of its selective action on the uterus, however uncertain the method of this action may be, has found an established place in the treatment of hemorrhage from this organ. The general action of ergot, which depends on its still doubtful complete composition, is not satisfactorily known. As a remedy in internal hemorrhage it may be said to be of doubtful value on account of its slow and lasting action. The rise of blood pressure which follows its use may or may not be general and may or may not affect the vessels of the bleeding area. If it is general, it would be harmful by more than counterbalancing the local contraction of the bleeding point and, further, if the vessels contracted did not include the bleeding area the rise of pressure would then be a counter-indication to its use. There is excellent reason for not using it in pulmonary hemorrhage, for pharmacologic studies have shown that it produces a distinct rise in blood pressure in the pulmonary artery.

OPIUM.

Opium, preferably in the form of morphin, is of great value in internal hemorrhage and this, not from any hemostatic action it possesses, or vasomotor effect, but because it allays the patient's restlessness and nervousness, thereby favoring clotting of the blood.

HYDRASTIS.

Preferably in the form of hydrastinin, has some reputation as an internal hemostatic, especially in menorrhea. It is a distinct stimulant to the circulation, causing a prolonged rise of blood pressure and a slowing of the pulse after moderate dose. The cause of the increased tension is not settled; there is probably stimulation of the vasomotor center and the peripheral vessels

are contracted possibly by direct action on their walls. The drug might be used in hemorrhages of a slow, oozing character, but in no others.

IPECAC.

The use of emetics in hemorrhages, especially pulmonary, has not met with favor of late. Graves, Trousseau, Peter, Massina, H. Weber and others were strong advocates of the use of large doses of ipecac, it being claimed that there follows a diminution in the size and strength of the pulse, and, in addition, that the blood is expelled from the bronchi where it is likely to become the source of reinfection. The great liability of the retching to induce fresh hemorrhage is a strong contraindication to its use. In tropical dysentery the drug seems to be almost a specific; we are in doubt whether this action is due to the alkaloids or the large amount of tannin the root contains.

ACONITE.

Aconite in small doses produces a slowing of the pulse with the fall of blood pressure, and seems especially indicated in the so-called sthenic cases. Aconite slows the pulse in the same way as digitalis but does not accelerate the arterial tension as does that drug.

NITROGLYCERIN AND THE NITRITES.

This group produces a profound fall in blood pressure by the dilatation of the peripheral vessels. It is stated that the vessels of the abdominal organs and the brain are more affected than those of the extremities. This group has been recommended for pulmonary hemorrhage. It would seem, however, that the general widening of the blood paths, together with the fact that the heart beats more rapidly under the lowered pressure, would contraindicate its employment. The general widening of the blood paths will frequently increase the caliber of the vessels of the bleeding area.

THE ANTIPYRETICS.

Antipyrin, especially of this group, possesses valuable properties as a local hemostatic, and has been employed internally for its supposed general styptic action. There is no evidence, however, that it possesses such. The depressant action of these drugs on the heart, together with the sedation which they often produce, may be of slight value.

FORMALDEHYD.

As a remedy by irrigation in the necrotic forms of dysentery, weak solutions of formaldehyd have been used with success. It has also been employed in climacteric hemorrhage and in uterine hemorrhages of unknown origin, by intrauterine application of a 40 per cent. solution of formaldehyd. A few drops of a very weak solution have been recommended for internal administration in gastric hemorrhage, yet the drug is distinctly toxic and highly irritating.

STRYCHNIN.

The action of this drug in producing stimulation of the vasomotor center has caused it to be employed for abdominal hemorrhage, owing to the constriction of the arteries of the abdomen and the dilatation of the vessels of the skin. Since, however, the blood pressure is raised and the drug possesses the property of producing motor excitement, it would not seem to be indicated in hemorrhage unless the patient was in a state of absolute collapse. The heart rhythm is slower after its use owing to the stimulation of the inhibitory center, but the rise of blood pressure would seem to more than counterbalance any good this might do.

ALCOHOL.

The use of alcohol in cases of hemorrhage is generally deprecated by recent writers. As a matter of fact, the whole problem of the action of alcohol is more or less *sub judice*. We know that in fevers it will frequently slow the heart, which action is probably brought about by lessening the cerebral excitement. This action might be of distinct use in hemorrhage. The drug in therapeutic doses produces but slight fall in blood pressure. There is some widening of the blood paths, but this is not great. Taking the evidence under consideration, the employment of alcohol in cases of severe hemorrhage (shock) may rest with the personal preference of the physician. A good deal has been said on both sides.

THE PURGATIVES.

The employment of purgatives is recommended in certain forms of bleeding, as in pulmonary and cerebral hemorrhages, as a satisfactory means of lowering the blood pressure. When the need is imminent, as in certain cases of apoplexy, venesection is preferable, and it is a mooted question whether the physical and mental strain induced by purgation in general will not more than compensate any good that may follow such treatment.

SALT SOLUTION.

Isotonic salt solutions (0.6 to 0.9 per cent.) are administered with excellent immediate results when the body has lost considerable blood or other fluid. Such solutions, by whatever route administered, are absorbed rapidly and are unirritating. The rapid improvement in the circulation which follows their employment is due to the mechanical effect of the increase of fluid, but they do not stimulate the heart directly.

CALCIUM CHLORID.

Within the past ten years calcium chlorid has gained considerable reputation as an internal hemostatic, it being claimed by Silvestri, Wright and others that its administration distinctly increases the coagulability of the blood. Wright, however, emphasizes the fact that after the dose is given in full dose for a number of days, from 30 to 60 grains, thrice daily, a reverse effect is produced. G. Gross and others have used calcium chlorid in bleeding from the uterus, administering it both internally and by vaginal douche. It is a common practice among surgeons to use it routinely for a few days prior to operation on such organs as the liver and pancreas, it being claimed that this checks the hemorrhagic tendency quite effectually. The clinical evidence of its value is far greater than the pharmacologic evidence, it being urged that the coagulability of the blood can scarcely be increased by the administration of the lime salts, since more is taken in the food than is sufficient for the organism, and the chlorid is not more easily absorbed than the combination present in the food.

GELATIN.

The Chinese and Japanese have used gelatin as a hemostatic for hundreds of years, and among western clinicians it has come into general employment since its recommendation by Dastre and Floresco in 1897. The drug may be used either by mouth or rectum, or hypodermically after thorough sterilization. It is

claimed by many to possess a coagulant action on the blood, but so eminent authority as Cushny states that there is no satisfactory evidence that the clotting is accelerated by its use.

In the articles whose authors concede the hemostatic action of gelatin there is not a satisfactory explanation for the effect. Zibell believes it to be due to the lime salt contained, .6 per cent. being found. This is a very small amount to account for such action. Edsall suggests that the increase in coagulability is brought about by the more rapid formation of fibrin ferments, owing to the destruction of the red blood corpuscles. Certain oils, notably turpentine and erigeron, while possessing no distinct hemostatic qualities, may yet act beneficially by their local constricting action in certain cases, as in intestinal hemorrhage of slow oozing character.

CONCLUSIONS.

In conclusion, it is necessary to bear in mind that the direct indications for treatment vary with the individual case. These indications include the source of the hemorrhage, the condition of the circulation and the amount of blood lost. In cases of total collapse, alcohol and strychnin would probably prove of value. Fainting from loss of blood may not in itself be an indication for medical treatment, for we know the value of this condition in inducing thrombosis.

The use of the vegetable and mineral astringents in those cases in which the bleeding point can not be reached directly, is highly illogical. The same is true of the use of the mineral acids. Aconite approaches the action of this group on the circulation, without the untoward local effects.

Ergot seems distinctively harmful in pulmonary hemorrhage, and from its action can scarcely prove of any value in other than uterine bleeding.

Hydrastis has some value in similar conditions. The susceptibility of the splanchnic area to vasomotor influence might be utilized by administering hydrastis and strychnin in bleeding of this region.

I have never seen noteworthy or conclusive results follow the employment of gelatin or calcium chlorid. Normal salt solution is undoubtedly a valuable agent, and immediate response often follows its use. I have had poor success with suprarenal extract administered for its internal hemostatic effect and believe that the indications for its employment are distinctly local.

There is great reliance to be placed on rest and quiet for the patient who is bleeding, and often this will suffice. Collateral measures, ligation of the limbs, change of posture, etc., are of great service. Next in importance I should place morphin to induce quiet. In those patients whose circulation is powerful, aconite is of unquestioned value. In gastric hemorrhage, there is a great tendency to employ the astringents. It is well to mention the impossibility of their reaching the bleeding point, the stomach being filled with blood and often with partly digested food. Suprarenal extract, while at times serviceable in such conditions, may fail for the same reason. Many of the drugs advised are nauseous and should be especially avoided; emetics or drugs disturbing the stomach are only likely to cause increased bleeding, owing to the physical strain of the emesis.

This very brief and incomplete review has been presented to emphasize the fact that we have not at hand a single internal hemostatic, the value of which is generally conceded; to show further that many of the agents employed do far more harm than good; that many are positively dangerous, and that a careful study of the individual case will generally show that very little drug treatment is indicated or can in any way do good. The physician is not certain in a particular case whether he has in any way aided nature in her efforts to check the bleeding.

The claims made for suprarenal extract, gelatin and calcium chlorid have not, in my experience, been borne out by fact.

DISCUSSION.

DR. WILLIAM J. ROBINSON, New York City, agreed with Dr. Coley that opium or morphin is of great practical value in internal hemorrhage, especially combined with a little atropin. He considers ergot unsuitable in hemorrhages from the lungs because it causes a rise in pressure in the pulmonary circulation. In gastric hemorrhage good results may be obtained from large doses of bismuth subnitrate, half an ounce at a dose. The patient should be kept in a reclining position and the stomach kept at rest. Aromatic sulphuric acid as an astringent is not safe in pulmonary hemorrhage, nor in gastric hemorrhage. In some cases of epistaxis that show great resistance to treatment, the bleeding will stop after the application of peroxid of hydrogen. Applications of fluid extract of hamamelis generally will control hemorrhage. Two hundred c.c. of gelatin injected into the back stopped a pulmonary hemorrhage which had resisted all other treatment. The patient died a few hours later and the pulmonary cavity was found filled with a large recent clot, showing the effects of the remedy. A number of cases are on record in which the use of gelatin was followed by recovery. One case of hemophilia was cured by gelatin, the treatment extending over six months. Dr. Robinson called attention to the great value of veratrum viride in hemorrhages; it does not act as an astringent; it lessens the peripheral resistance and lowers the pressure in the area around the point of hemorrhage.

DR. WILLIAM F. WAUGH, Chicago, suggested the use of atropin in addition to other therapeutic agents, as by its means the blood is directed to the peripheral vessels and can not flow from the wound at the same time. The life of a boy, with a pistol wound and apparently dying of hemorrhage, was saved by giving nitroglycerin to attract the blood to the capillaries, and atropin was given to keep it there. This was all that was needed. The action of hydrastinin is so slow as to exclude its use in all hemorrhages except those due to capillary oozing; it is not to be relied on in sudden uterine hemorrhage.

DR. W. C. ABBOTT, Chicago, emphasized the value of morphin, especially when combined with a little atropin, in pulmonary hemorrhage. Atropin relieves pressure and the morphin relieves the irritation in the respiratory organs, and quiets the patient. Therefore, the dose of morphin should be very small and that of atropin relatively large in order to produce the best effect. It is probably the fact that the arterioles around the area of hemorrhage are contracted by the effort of Nature to stop the hemorrhage. There is also a mental unrest and fear of bleeding to death, which by suggestion increases the condition. The morphin, therefore, aids the atropin in drawing the blood away from the part. The combination has no hemostatic action in typhoid fever.

DR. HORATIO C. WOOD, JR., Philadelphia, said that in a case of external or of internal hemorrhage the object of treatment is to permanently close the bleeding points with a clot. Therefore, any drug which causes increase of blood pressure does harm. The only reason that more patients are not killed by ergot is because it is used in too small doses. Atropin is equally with ergot contraindicated in hemorrhage; it elevates internal pressure more even than does ergot. Nature stops hemorrhage by lowering blood pressure until the blood has had time to clot. For this reason aconite in small doses may be useful. Stimulants may be of value, not, however, to check the bleeding, but to sustain the heart. Dr. Wood believes that

gelatin is of great value in increasing the coagulability of the blood, and pointed out that all the colloid substances possess this property. One reason why gelatin sometimes fails is because it is not used properly. In a Philadelphia hospital, a patient with typhoid fever had hemorrhage from the bowels. One-half an ounce of gelatin was ordered given every hour until relieved. The next day the same hemorrhage was going on, and it was found that a tablespoonful of ordinary prepared gelatin had been given, which contains about 3 per cent. of gelatin. Half an ounce of the dry gelatin must be given in order to have any effect.

DR. HENRY W. COOK, Richmond, Va., emphasized the danger of giving stimulants to persons with hemorrhage. A patient who was very badly injured and in shock from hemorrhage was given adrenalin, which caused a rise of blood pressure, but disturbed the clot; bleeding returned and he bled to death in ten minutes. Vasodilators may push the patient over the border line and cause death. Tentative treatment until the patient is over the danger point is the best treatment.

DR. W. B. ROBINSON agreed as to the value of gelatin in increasing the coagulability of the blood. When administered to a dog, the blood drawn will coagulate in ten minutes, while the blood from another dog, without gelatin, requires half an hour. It should be remembered, however, that the gelatin should not be cooked when given for this purpose, as by cooking it is converted into a different substance.

DR. ABBOTT disagreed with Dr. Wood, who said that atropin is not a remedy to give in internal hemorrhage. Dr. Abbott said that his views were derived from experience at the bedside. The increase of pressure at the point of hemorrhage will be overcome, if there is dilatation elsewhere, by the use of atropin.

DR. C. E. DE M. SAJOUS, Philadelphia, asked if some of the authorities quoted do not state that the action of the atropin is exercised on the arterioles. He said that this would sustain the contention of Dr. Abbott. One would have, in that case, to recognize the fact that the arteries are supplied with a muscular coat while the capillaries are not, and that the bleeding area could thus be deprived of blood and the hemorrhage arrested merely through contraction of the arterioles.

DR. HORATIO WOOD, JR., replying to questions, stated that the effect of atropin is demonstrable by placing a canula in a dog's artery. After giving atropin the blood pressure goes up, because the small arteries in the interior of the body are contracted. Atropin acts particularly on the arteries and very little on the veins; but the great danger is from arterial hemorrhage. Too small doses have no effect.

DR. ABBOTT said that while Dr. Wood gives atropin and gets internal rise of blood pressure, he claims that vasomotor influence sends the blood to the periphery and equalizes the circulation throughout the body.

DR. O. T. OSBORNE, New Haven, Conn., declared that one of the greatest dangers in internal hemorrhage is the contraction of the peripheral vessels, due to the fear of death. Atropin and morphin will produce peripheral flushing and will always help these cases.

DR. T. L. COLEY said that while morphin has no specific action in cases of internal hemorrhage, it allays the patient's restlessness, thus inducing conditions favorable to clotting. The use of bismuth in gastric hemorrhage is open to the same objection as the preparations of iron. In the presence of masses of food particles and blood clots the astringent action would, in the average case, be valueless and the mechanical effect slight. Washing out of the stomach in cases of gastric hemorrhage to remove the offending material is a step too fraught with danger to be employed with safety. The use of atropin seems to Dr. Coley to be contraindicated from its physiologic action—the rise of blood pressure which follows its administration. Clinical evidence is extremely unreliable in estimating the value of any treatment for hemorrhage. It is very difficult to calculate the extent of internal bleeding or the effect of a given drug. In a case of intestinal hemorrhage in typhoid fever several drugs may have been employed and we do not know which of these, if any, has produced a favorable effect. The spontaneous effort of Nature must not be overlooked. A second patient may recover from severe intestinal hemorrhage without having received any drug treatment whatever.

A STUDY OF APOCYNUM CANNABINUM.*

HORATIO C. WOOD, JR., M.D.
Demonstrator of Pharmacodynamics at the University of Pennsylvania.
PHILADELPHIA.

(Done Under a Grant from the National Academy of Sciences.)

Apocynum cannabinum, commonly known as Canadian hemp, has long been used by certain Indian tribes in the treatment of dropsies and as an antidote to snakebite. The credit of being the first to call the attention of the medical profession to the value of this remedy appears to be due to M. L. Knapp who, in 1826, ascribed to it great value as a diuretic. In 1833 Griscom published the records of a number of cases of anasarca in which the drug had been used with marked benefit. Despite, however, several clinical reports confirming its utility, the remedy appears to have passed into comparative desuetude for a number of years, until in 1898 Dabney contributed a paper reviewing what was known of its physiologic action and describing a number of cases of various conditions of circulatory weakness from valvular lesions of the heart and of edema dependent on disease of the kidneys, which were benefited by the use of Canadian hemp. The evidence gathered from a review of the not very extensive literature on this drug, as well as from my own experiments, indicate very clearly that in *Apocynum cannabinum* we have a remedy of marked value, but which has not achieved such a prominent place among the practical therapeutic agents as it apparently deserves. It is strange how slowly the profession adopts new drugs, the evidence of whose value rests on the observations of experienced clinicians and scientific investigators, when compared with the avidity with which is taken up the products of interested pharmaceutic manufacturers, whose greatest recommendation rests on highly laudatory and widely distributed advertisements. The clinical evidence of the value of *Apocynum cannabinum* and the comparative poverty of studies of its physiologic action have made it appear worth while to study more exhaustively the effect of this substance on the animal organism, and especially on the circulation.

There are several representatives of the genus *Apocynum* indigenous to this country. It would seem, however, from the work of Griscom and Dabney that of this genus only the species of *Apocynum cannabinum* is of value in the treatment of dropsy, although some authorities ascribe similar virtues to *Apocynum androsæmifolium.* My experiments have been made with the fluid extract of *Apocynum cannabinum.*

CIRCULATION.

The changes in the circulation following the intravenous injection of moderate doses of fluid extract of apocynum consist in a marked slowing of the pulse accompanied with a rise of blood pressure. (Tables 1 and 2.) After large doses the pulse becomes exceedingly rapid, the pressure ascending as the result of the increased pulse rate still higher. (Tables 1 and 3.) There was no secondary depression of the circulation;

---

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Pharmacology, and approved for publication by the Executive Committee: Drs. G. F. Butler, Solomon Solis-Cohen and O. T. Osborne.

in those cases in which sufficient quantity was given to cause death the heart ceased with great suddenness. (Tables 4 and 5.)

After death the heart was always found in complete diastole. In one or two experiments mechanical irritation of the heart caused a few feeble contractions, but in the majority of the experiments in response to such irritation it passed into a state of fibrillary contraction. In one experiment in which the heart was exposed before the drug was given and directly observed under large doses, it passed into fibrillation directly on cessation of its beats without any stimulation.

TABLE 1.—(Weight of dog 10.6 kilo.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	138	17	
1:00	145	9	1 c.c. inj. at 0:5. Not breath'g.
2:00	220	38	Heart stopped suddenly 1 min. later.

TABLE 2.—(Weight of dog 9.5.)

Min. and sec.	Pressure.	Pulse in 10 secs.	Resp.	
0:00	100	17	33	
1:45	116	11	42	At 0:5 Inj. 0.25 c.c. At 2 Inj. 0.5 c.c.
3:30	155	19	11	Resp. dec., pulse irreg.

TABLE 3.—(Weight of dog 6.05.)

Min. and sec.	Pressure.	Pulse in 10 secs.	Resp.	
0:00	120	30	12	Left vagus cut.
1:30				Inject. 1 c.c.
2:00	163	20	17	
2:40				Inject. 1 c.c.
3:00	182	36		Resp. almost impercept.

Stimulation of peripheral end of vagus had no effect on pulse or blood pressure, but respirations became very deep.

TABLE 4.—(Weight of dog 16.6.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	36	19	An attempt was made to cut the cord, but postmortem showed it uninjured.
1:30	67	10	1 c.c. at 0:50.
2:40	98	8	Left vagus cut.
3:10	154	10	
3:40	200	28	Right vagus cut at 3:20.

Later, 2.5 c.c. caused death. (Fig. 4.)

TABLE 5.—(Weight of dog 8.3.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	135	31	Both vagi have been divided.
2:00	47	25	Spinal cord has been cut.
2:30	51	23	Strongly irritate vagus for 20".
3:00	54	23	
4:00	37	24	50" asphyxia.
5:00	41	24	
6:40	190	25	0.5 cm. fl. ext. of apocynum. inject. 5:10.
7:00	197	26	Begin. asphyxia.
8:10	142	33	End asphyxia.

Dog killed by 1.25 cm. (Fig. 5.)

TABLE 6.—(Weight of dog 5 kilos.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	143	25	Both vagi cut.
1:30	119	22	Cord cut.
1:40			Begin. asphyxia.
2:30	72	19	End. Asphyxia.
4:30	55	23	
4:55	58	23	
4:55	58	23	20" irritation of central end of vagus.
5:10			Inj. 0.25 c.c. fl. ext.
7:10	175	22	

Asphyxia causes progressive fall of pressure till death. Traube waves. Postmortem showed cord almost but not completely cut.

The slowing of the heart was immediately abolished by division of the pneumogastric nerve (Tables 5 and 8), and did not occur if the vagi had been cut before the drug was administered. (Table 6.) It is, therefore, due to stimulation of the inhibitory centers.

The inhibitory stimulation is so marked that it interferes or may mask the stimulant influence of the drug. Thus, in Table 1, the blood pressure arose only from 138 to 145 mm., while in Table 7 the pressure arose as the result of the first injection from 77 mm. to only 117, and a second injection caused even a fall of the blood pressure. It is noteworthy that in both of these experiments the rate of the heart was extraordinarily slow, in Table 7 being reduced from the rate of 192 a minute to 24 a minute. That the failure of the pressure to rise under these circumstances depended on the slowing of the pulse is shown by the fact that after the disappearance of the inhibitory stimulation the pressure primarily ascends. Thus, in Experiment 7, as the result of the division of the pneumogastric nerves, the pulse rate rose from 24 to 180 a minute, and the pressure in the arteries was more than doubled, rising from 84 to 188 mm. (Fig. 1.)

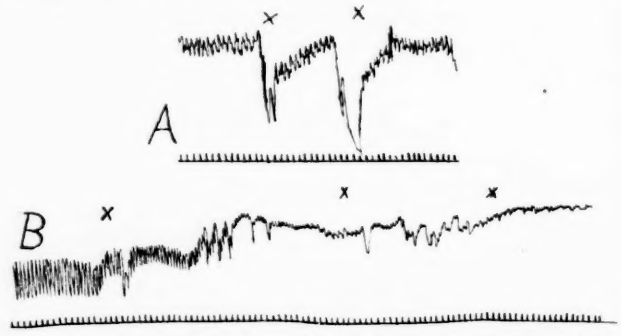

Fig. 1.—A. Before administration of apocynum. B. After administration of apocynum, showing the changes produced in the circulation by apocynum, namely, rise of pressure, slowing of pulse and later increase in pulse rate and the late paralysis of the cardio-inhibitory mechanism. X. Stimulation of vagus.

The rise in the pressure in Table 1 can, I think, also be justly attributed to the increase in the pulse rate, evidently brought about by secondary paralyzant effect of the drug on the pneumogastric nerve, and not to the asphyxia. Immediately before the rise an attempt was made to practice artificial respiration by manual compression of the chest. Of course, this method does not guarantee that the animal was receiving enough air to prevent asphyxial stimulation of the vasomotor centers; nevertheless, the suddeness of the rise of the pressure and the time of its occurrence indicate clearly that it depended on the increased rate of the pulse.

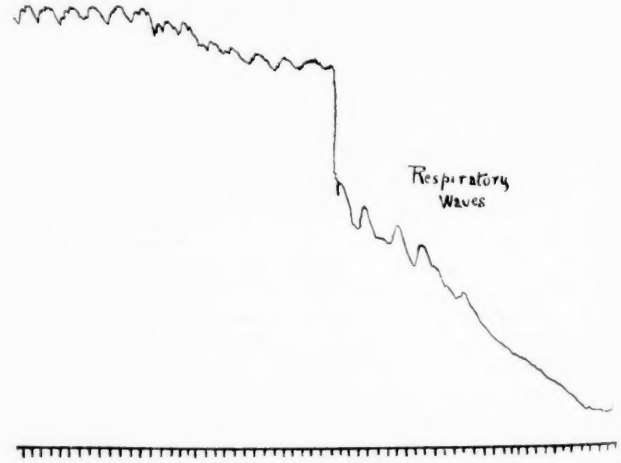

Fig. 2.—Showing the sudden cessation of the heart in fatal apocynum poisoning. The movements on the fall of the needle are due to respiratory efforts and are not pulse waves.

The secondary increase in the rate of the pulse is probably due to a late paralysis of the peripheral terminations of the pneumogastric nerve, since electrical irritation of this nerve had no effect on the pulse rate. (Table 3.)

The rise of the pressure is not dependent on any changes in the respiration or motor excitement as it

occurred equally as marked in thoroughly curarized animals as in the normal dog. (Table 8.) According to Dotschewski,[1] the rise of pressure depends on a stimulation of the vasomotor centers in the medulla and spinal cord.

TABLE 7.—(Weight of dog 7.7.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	85	33	Spinal cord has been cut.
0:10–2:30			Asphyxia.
2:40	69	32	
8:10	77	33	
8:10			Inj. 1 c.c. fl. ext. apocynum.
11:10	117	16	Inject. 1 c.c. at 11:15.
15:10	84	4	
15:20	188	30	Cut vagi.

Postmortem showed the spinal cord had been cut between the second and third cervical vertebræ. The cord was entirely severed save for a small amount on the anterior aspect. Both the lateral tracks seemed to be completely divided as well as all the posterior columns. (Fig. 5.)

TABLE 8.—Weight of dog 10.4 k. Curarized.)

Min. and sec.	Pressure.	Pulse in 10 secs.	
0:00	88	28	At 0:5-0:30 inj. 0.03 gm. Curare.
2:50	73	35	Artificial respiration.
3:00			Inject. 0.01 gm. apocynin.
3:50			Inject. 0.02 gm. apocynin.
11:00	77	29	Manometer tube slipped.
12:30	88	30	0.07 gm. has been injected.
14:30	91	30	At 14" inject. 0.07 gm.
17:30	81	28	
18:00	43		17:50 inj. 0.07 gm.
18:30	97	25	0.04 gm. inj. no marked effect.
20:30	92	29	20:35 inj. ¼ c.c. fl. ext. apocynum and 21:30 1.25 c.c. mere fluid extract.
21:10	142	15	
22:10	184	36	
23:10			Heart stopped suddenly.

Apocynin 1 per cent. solution in dilute sodium carbonate. (Fig. 6.)

My own results lead me to contrary conclusions, because I have found that after section of the spinal cord the elevation of the blood pressure is equally as marked, if not more pronounced, than in the normal animal. Thus in the experiment No. 5, in which the normal pressure was 135, but fell to 47, after division of the spinal cord, under the influence of apocynum the pressure arose to 197. That the cord was completely divided was verified both by postmortem examination and by the fact that neither irritation of the central end of the vagus nor asphyxia caused any elevation of the blood pressure. In the experiment No. 7 the result of the injection was the same. In this experiment, although after postmortem a small portion of the anterior part of the spinal cord was found not completely divided, the fact that neither irritation of the vagus nor asphyxia caused any rise in the pressure, shows that the vasomotor fibers had been completely divided. When we compare the effects of apocynum in the normal animal and after section of the spinal cord, it is seen that in the latter case the pressure arose not only a greater number of millimeters, but reached a point as far above the normal pressure as in the uninjured dog. Thus the average of rise in Tables 1, 2 and 3 in which the cord was not divided is 66.3 mm. above the normal, while the average in 5, 6 and 7 in which the cord was divided was 65.6 mm. higher than the pressure before the section of the spinal cord. It is evident, therefore, that destruction, at least of the medullary vasomotor centers, has no influence on the stimulant effect of the drug on the circulation. That the drug has a stimulant influence on the cardiac muscle, is evident from the character of the pulse wave, and also from the fact that the frog's heart was arrested in systole.

It seems extremely improbable that any stimulation of the heart could be sufficient to explain such an enormous rise amounting to 156 mm. in one experiment (Table 5) as was obtained in these experiments if the blood vessels were relaxed, as, of course, they normally are after division of the spinal cord. Of course, these experiments do not prove that the drug has no influence on the vasomotor centers located lower down in the spinal cord, but these centers are so comparatively feeble that it seems unlikely that they play any great rôle in the marked elevation of the arterial pressure, especially in view of the fact that they did not respond to the stimulation of carbonic acid. It would, therefore, seem probable from these results that the rise of pressure depends on a simultaneous stimulation of the heart and of the muscular coats of the arteries.

My belief that there is a constriction of the vessels as well as a stimulation of the heart is further borne out by experiments made on the volume of the kidney. For this purpose I employed the well-known oncometer of Roy. With this method I obtained constantly a

TABLE 9.—(Weight of dog 15 kilos.)

Min. and sec.	Press.	Pulse.	Kidney.	
0:00	125	20	4.3	
1:00	125	20	4.2	
1:30	122	19	4.2	
2:30	120	25	4.1	2:35 inj. 1½ c.c.
3:00	140	22	4.0	
3:20	140	21	3.6	
4:20	140	19	2.7	
5:20	140	19	2.5	
6:30	138	22	2.2	
7:20	141	20	1.5	Inj. 1 c.c. at 6:50.
8:20	150	27	0.5	
9:20	150	27	0.4	
11:30	147	42	1.0	

TABLE 10.

Min. and sec.	Press.	Pulse.	Kidney.	
0:00	155	22	2.1	Dec. 8, wt. of dog 17 k.
1:10	155	25	1.6	
6:00	158	24	2.0	
6:40	180	20	2.1	6.20 inj. 1½ c.c.
6:55	170	17	1.5	
7:10	168	18	1.1	
7:30	174	16	0.9	
7:45	180	13	0.8	
8:00	200	10	1.0	
8:40	260	33	1.7	
9:00	290	40	1.9	
9:30	260	40	1.7	
10:20	46	..	2.2	Heart has stopped.

These figures refer to c.c. of fluid in the registering tube. The fall, for example, in Table No. 9, from 4.3 to 0.4 means that the kidney has diminished in volume to an extent of 3.9 cubic centimeters.

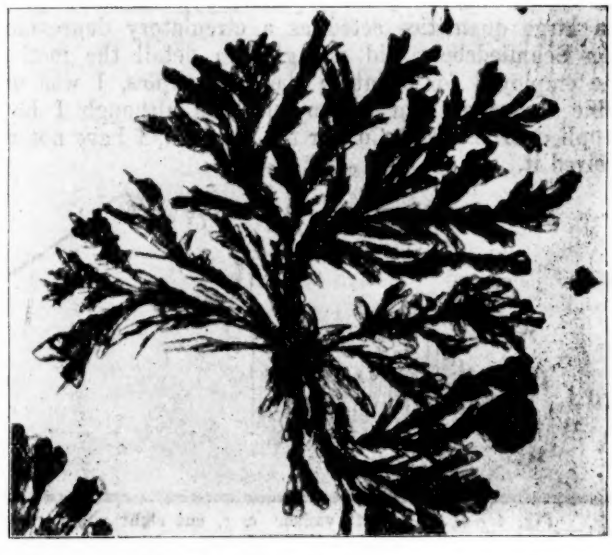

Fig. 3.—Crystalline body separated from apocynum cannabinum.

1. I have not had access to the original paper by Dotschewski, which was published in the Russian periodical *Vratch*. In the abstract I have quoted from there were no details of the experiments by which he reached his conclusions. It is impossible therefore to explain the contradiction between his results and my own. Incidentally it may be mentioned that in all other points our conclusions are in accord.

diminution in the volume of the kidney betokening a corresponding lessening in the caliber of the renal capillaries. (Tables 9 and 10.)

If given in sufficient quantity, apocynum produces in the frog complete paralysis. Its action, however, on the nervous system is quite subsidiary to its effect on the circulation, for I found that after a dose sufficient to cause arrest of the heart, there was still a certain amount of voluntary and reflex power, and the motor nerve responded normally to electrical irritation for two hours after the heart had stopped beating.

ACTIVE PRINCIPLE.

In 1883 Schmiedeberg isolated two substances from *Apocynum cannabinum,* which he believed to be the active principles. Of these one was a glucosid, to which he gave the name of apocynein, the other he obtained as an amorphous substance, the chemical character of which he did not determine, and to which he gave the name of apocynin. I was kindly furnished by Merck & Co. with a substance labeled "apocynin," which, however, I found to be almost inert. It produces none of the characteristic changes in the blood pressure produced by the crude drug (Table 8), but when given in large quantities acted as a circulatory depressant. As Schmiedeberg did not give in detail the method he employed for isolating these principles, I was unable to make them for myself, and although I have applied to Merck & Co. for the glucosid, I have not received it.

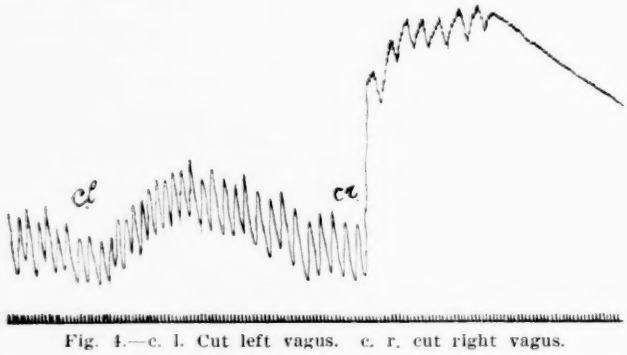

Fig. 4.—c. l. Cut left vagus. c. r. cut right vagus.

Under these circumstances it seemed to me advisable to make an independent attempt to isolate the active principle for myself. This portion of the investigation was carried out in the chemical laboratory of Professor Marshall, to whom I desire to express my thanks for constant advice and assistance in the investigation. After trials with a large number of extracting substances, I finally obtained by extraction with benzole a crystalline body, contaminated, however, with a large amount of yellow resin-like material. Physiologic tests of these impure crystals showing they were active, I attempted to obtain them in a purer form. To accomplish this end, I first tried washing the mass with a large number of solvents, but the result from this procedure was negative, the crystals being soluble in all these solvents which took up the resin. Finally, by dissolving the mass with hot water and then allowing it to cool, the crystals separated out in a comparatively pure condition. After repeating this process several times I obtained crystals which, although not absolutely clean, were very nearly so. These crystals when tested physiologically arrested the frog heart in systole; a dose of 2 mg. per kilo in a dog produced distinct elevation of the blood pressure with slowing of the pulse; a dose of 1 cg. was sufficient to cause death in a dog weighing 4.2 kilo with the characteristic and sudden arrest of the heart. (Fig. 3.)

These crystals were soluble in ether, chloroform, alcohol, acetone, benzol and hot water, and were insoluble in cold water, petroleum ether and carbon bisulphid; their melting point was 112 C. On making comparative tests with Merck's apocynin I found it had the same solubilities and had a melting point of 113 C. I am inclined to believe, therefore, that the crystals which separated are identical with Merck's apocynin, the slight difference in the melting point being explained by the contamination which was present in my crystals.

In view of the fact that Merck's apocynin was inactive, I am inclined to believe that the activity of the crystals I separated was due to the adherence of the active principle which I regarded at first in the light

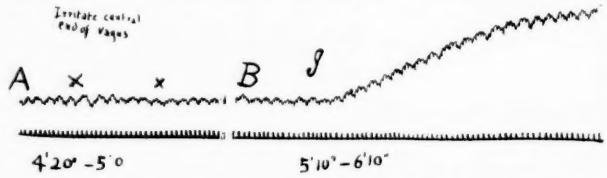

Fig. 5.—Both pneumogastrics and the spinal cord are cut. A. Before injection. The failure of irritation of the vagus to produce rise of blood pressure shows complete destruction of cord. B. Shows the rise of blood pressure under apocynum, also that the drug does not slow the pulse after section of the vagi. X. Irritation of vagus. I. Injection of apocynum.

of a contamination. In support of this view are the following facts:

From 259 c.c. of the fluid extract I obtained 0.6 gm. of impure crystals, that is about 2.3 milligrams from 1 c.c. The dose of the fluid extract required to kill a dog is about 0.1 c.c. per kilo of body weight; if the activity of the plant depended on the crystals it would, therefore, require about 0.2 milligram per kilo to kill, but I found by experiment that with the impure crystals it required approximately ten times this amount. Moreover, the more I purified them the feebler did they become, so that with the purest crystals 43 milligrams

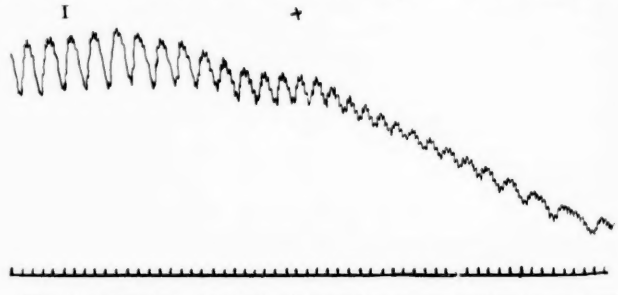

Fig. 6.—Showing the fall of blood pressure under large doses of apocynum; smaller amounts had no effect at all. I. Injected apocynin. X. Stimulation of vagi.

failed to kill a dog weighing 9 kilos, although it did cause a marked slowing of the pulse. Beside this, the original residue left after thorough extraction with a number of agents did not seem to be much diminished in its power, and the material which was separated during the course of the purification of the crystals and which I had regarded as an impurity was physiologically active.

The separation of the active principle from the residue left after extraction with benzol has been a difficult problem which I have not yet succeeded in solving. I have attempted to obtain the active substance of apocynum with a number of methods which have yielded me more or less concentrated preparations of

the active principle, but I have not yet succeeded in obtaining it in a pure form.

The addition of basic lead acetate produced a copious precipitate, but the active substance was not thrown down, passing over into the filtrate. After freeing the latter from lead by passing through hydrogen sulphid, and evaporating the resultant filtrate there was left behind a mass of thick syrupy consistence, which evidently was largely glucose, since it reduced Fehling's solutions and was also fermentable. In order to get rid of this sugar I took the filtrate resulting from the first precipitation from lead acetate, which still contained an excess of this reagent, and added ammonium hydroxid, with the hope that a portion at least of the glucose might be precipitated as a lead saccharate. Even by this means, however, I failed to get rid of all the glucose, so that I still had left behind a substance which could not be evaporated to dryness. This residue was extracted successively with ether, chloroform, benzol, acetone, amylic alcohol and petroleum ether without yielding any results.

Although I have not succeeded in obtaining the active principle in the pure form, I am, nevertheless, strongly inclined to believe that it is in the nature of a glucosid. This view is supported in the first place by physiologic evidence that all cardiac poisons which resemble digitalis in their action which have as yet been isolated have been glucosids. More important than this, however, is the following chemical evidence: I took 5 c.c. of the fluid extract, which had been freed from resin by precipitation with water, and evaporated off the alcohol, added to it some dilute hydrochloric acid and boiled fifteen minutes. The resulting fluid was neutralized with sodium carbonate and injected into the vein of a dog, with the result that there was neither elevation of the blood pressure nor slowing of the pulse.

DISCUSSION.

DR. CLEMENT B. LOWE, Philadelphia, stated that there is some uncertainty, when apocynum is spoken of, whether we are dealing with *Apocynum cannabinum* or *Apocynum androsæmifolium*, dog's bane. He went to a large drug house for some cannabinum, and found that it was androsemifolium. He returned it and was told that they always supplied that preparation when apocynum was ordered. Dr. Lowe said that he is afraid, therefore, that Dr. Wood has been working with androsemifolium. The two are very much alike, but differ microscopically in the arrangement of some of the bark cells, which in dog's bane are thick-walled and arranged in groups in a circle near the middle of the bark. It also responds differently to the phloroglucin test. To distinguish them is also more difficult because of the tendency of dog's bane and Canadian hemp to hybridize. A few years ago, when Dr. Lowe was out botanizing, he came across a plant that he could not understand; on studying it he found that it was a hybrid of these two species. The value of a bitter principle is that it causes an increased flow of gastric juice, just as it increases the saliva. Its bitterness is the important feature, and it is lost when disguised. If patients complain that it is bitter, tell them that is why it is given, and that the effect of the bitter can not be obtained without giving a bitter drug.

PROF. C. S. N. HALLBERG, Chicago, called attention to the fact that the alcoholic concentration has been on the market for twenty or thirty years. This preparation of *Apocynum cannabinum* is called "apocynin," and is prepared by precipitating a concentrated alcoholic tincture of the drug in water, following the usual eclectic method and nomenclature. It would be well to remember the fact that if any physician should prescribe apocynin he would probably get, in the vast majority of instances, the eclectic resinoid, instead of the glucosid recommended by Dr. Wood.

PROF. JOSEPH P. REMINGTON, Philadelphia, said that we are all very apt to believe that the active principles of the various drugs are either alkaloids or glucosids of a crystallizable character. We have been led to this idea from the fact that morphin, strychnin, codein and many others are crystalline. In a great many instances the active principles are not crystallizable. For instance, in cubeb and pepper oleoresins are the important constituents. He thinks that the active principle of the drug would be more likely to be a resinous substance, possibly left in the solution which Dr. Wood threw away, instead of the crystallizable principle. In determining these questions Dr. Wood has a much better opportunity of carrying on an investigation into their physiologic action than a pharmacist would have.

DR. H. C. WOOD, JR., said that he was supplied with fluid extracts of both cannabinum and androsemifolium, but he had relied entirely on the statement of the pharmacist as to the identity of the fluid extracts. He stated that he did not throw away the residue after getting the crystals, and on subsequent trial he found that it had some activity. He said that the drug is useful in cases of dropsy, whether associated with cardiac weakness or hepatic cirrhosis. He hopes at a future time to bring some more accurate observations on the clinical uses of the drug.

USE OF DIAPHORESIS AND DIAPHORETIC AGENTS IN OPHTHALMIC THERAPEUTICS.*

HIRAM WOODS, M.D.
BALTIMORE.

To properly estimate the therapeutic value of an agent, allowance must be made for the natural enthusiasm of those who introduce it and who often record results which later experience fails to confirm, and the tendency of certain things to remedy themselves, the exciting cause having been removed. Disappointment may ensue because too much is expected. Credit may be given when none is due. Truth lies between these extremes, and is to be reached, it seems to me, by finding out what one should look for, basing judgment on the physiologic effects of the remedy, and the teachings of clinical experience. An example of what one may, not illogically, term therapeutic enthusiasm and therapeutic chaos, is found in the statements of books on general therapeutics and those on eye diseases, regarding the use of diaphoretic agents in ocular affections. If we could accept, for instance, all of the following from Potter's "Materia Medica," pilocarpin would be little short of an ocular panacea. Says this writer: "Ophthalmologists employ pilocarpin with most excellent results in the amblyopia of alcoholism, and that from the use of tobacco, in detachment of the retina, chronic iritis, keratitis, glaucoma, hemorrhage into the vitreous, atrophic choroiditis, white atrophy, to promote resolution and absorption in inflammatory conditions with exudation." Bartholow and other writers indicate practically the same scope. The student turning from this general advice to special works will, I think, be disappointed if he expects to find specific and positive information as to what in this list is true and what is not. Most of our special writers indicate that diaphoresis has been recommended or may be tried in these conditions; but in no text-book with which I am familiar is there the positive teaching the subject deserves, and which is justified by our present knowledge. Scattered through current literature are many most interesting and in-

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Ophthalmology, and approved for publication by the Executive Committee: Drs. Frank Allport, John E. Weeks and R. L. Randolph.

structive articles, but they are so scattered that their usefulness is greatly lessened. The object of this paper and the paper by Dr. Woodruff is to set forth briefly what, in the opinion of the writers, may be theoretically expected in ophthalmic therapeutics from diaphoretic agents, and the extent to which their own and others' clinical observation confirm or contradict claims from time to time put forth for this method of treatment. I regret that my recent illness has prevented such a search of current literature as I wished to make, and confined me to articles at hand or with which I was previously familiar. Still they cover more or less completely the principles involved.

Normal sweating is the result of glandular secretion. Physiologists no longer hold that transudation from the cutaneous blood vessels is its most important element. Says Stewart in his "Manual of Physiology": "Though an actively perspiring skin is in health a flushed skin, the vascular dilatation is a condition and not the chief cause of the secretion." . . . "Even the sweating produced by exposure to high temperature is normally brought about by nervous influence and not by direct action on the secreting cells." How far is the profuse sweating from diaphoretic agents, or high temperature employed in baths or cabinets, to be attributed to secretion from nerve stimulation and how far to transudation from cutaneous blood vessels? That the sweat glands can be stimulated to such an abundant secretion as is observed seems almost incredible. Yet the great salivation, sometimes produced by pilocarpin, shows that glandular activity plays an important if not the main part.

Secretions, however, must ultimately be derived from the blood, and there is doubtless a large element of truth in Hansell's[1] statement: "The efficacy of pilocarpin is, I believe, to be attributed to the inordinate activity of the lymph system induced by its presence. By depriving the peripheral vessels of a large proportion of their fluid content, those of the internal organs meet the deficiency, thus eliminating morbid products together with physiologic excretions."

If the therapeutic efficacy of diaphoresis is due solely to this vascular effect, equally good results should follow similar action on other vascular areas, which, for our purposes, are essentially peripheral. Those of the intestines and the use of salines and hydragogue cathartics illustrate. The copious watery evacuations from these agents are not, however, at least in my experience, followed by anything like the results observed after the use of diaphoretics. Nor does emptying the cutaneous vessels, with compensative filling from internal structures, explain the good results of small doses of diaphoretic agents, which do not produce copious sweats.

There must be something besides this transudation from peripheral vessels, and, I think, we may well consider in this connection the nervous influence which lies behind the diaphoresis. Pilocarpin is the drug in most common use. It acts on the skin by its stimulating effect on the cerebrospinal nerves supplying the sweat glands. Another of its physiologic effects is its inhibitory and paralyzing effect on the vasomotor system. One is surprised—at least I was—to note the similarity between the physiologic effect on the eye of pilocarpin and the results of section of the cervical sympathetic nerve or ganglion, when reading the scholarly paper presented to this Section a year ago by de Schweinitz. If one has occasion to observe cases of bad effects from diaphoretic agents—the nausea, vesical disturbance, cardiac weakness, etc. —he will find abundant evidence, that in both its stimulating and depressing effect, a diaphoretic has marked nervous influence. By its action on the vasomotor system dilatation of the small arteries, with lessened resistance to blood flow and heightened local temperature, are produced. It seems to me, then, that in estimating the cause of the efficacy of diaphoretic agents, we should count first, as Hansell has said, depletion of cutaneous vessels; and secondly, the action of diaphoretic agents, pilocarpin particularly, on the small arteries.

From this we can draw two theoretical conclusions which clinical experience confirms: 1. Diaphoretic agents should have their greatest efficacy in structures richly supplied by blood vessels. 2. This efficacy should show itself in lessening of hyperemia and removal of exudates.

Of ocular structures the uvea, and hence the vitreous, retina and orbital tissues seem to present most prominently the anatomic and physiologic characteristics. Certain lesions with which the use of diaphoresis has been associated can, I think, be excluded. Atrophy of the optic nerve, no matter what the primary cause nor how clearly it might have come earlier, under this plan of treatment, is out of the question; so is optic neuritis, dependent, as it nearly always is, on extraocular disturbance. An exception must be made here of certain retinal lesions which may be accompanied by more or less papillitis.

It is equally irrational, I think, to apply this treatment to choroidal atrophy, cicatricial changes in the vitreous or uvea following long-standing iridochoroiditis, "chronic iritis" (in the sense of irritative symptoms persisting after an iritis has recovered with synechiæ, and to be distinguished from relapsing iritis), retinal detachment resulting from cicatricial contraction, primary glaucoma. All of these lesions are either essentially incurable or else are better treated in other ways. Whatever good seems to ensue in such patients from the use of diaphoretic agents is probably due to their influence on the choroidal circulation, and hence on the vitreous opacities; but the underlying diseases are not influenced, and in glaucoma time and possibly opportunity is lost.

In another class of cases there is little probability of good, because the tissues involved are not sufficiently vascular to respond. I allude to keratitis and affections of the sclera. In such of these cases as seem to have been helped, I incline to the opinion that a more careful diagnosis would have shown some form of uveitis underlying the superficial disturbance.

Excluding all the above, there are left many lesions which are most satisfactorily treated by diaphoresis. They are acute troubles in the uvea, retina, orbital tissue and toxic blindness. Uveal disturbance will be presented at length in the paper of my friend, Dr. Woodruff. I want, however, to mention in passing three observations made this past winter in cases of iritis. All three were of rheumatic origin, two private cases of my own, and one a hospital patient of my colleague, Dr. F. M. Chisholm. In both of mine, atropia seemed to dilate the pupil a very little, and then, in spite of pushing it to constitutional effects, using an eight-grain solution, and finally the atropia discs, I could not obtain further dilatation. One patient was in intense pain, the other suffered only moderately. The former was given a copious pilocarpin sweat. The latter was sweated, somewhat unintentionally on my part, by taking an unusually large dose of salicylate of sodium. In

1. Philadelphia Polyclinic, Nov. 20, 1897.

each instance, the day after diaphoresis both pupils dilated ad maximum. An interesting thing was then observed, viz., that there were no points on the lens surface indicating synechiæ. Apparently the pupil was kept small through intense iridic hyperemia, and dilated when this was relieved. Chisholm's case was similar in essentials, and had resisted eleven days of strong atropia. There were, however, marks of synechiæ.

A case illustrating the ease with which one can think he has obtained results which he has not is the following:

A young colored man came into my clinic two years ago with a history of defective sight for a fortnight, terminating in pain, which latter symptom led his physician to send him to a hospital. He was almost entirely blind. Pupils were immovable and a little larger than normal. Corneæ were steamy, tension increased, nearly plus 2. I advised immediate iridectomy for glaucoma, which the patient declined. He was put to bed, eserin used locally, and he was given three profuse jaborandi sweats on successive nights. Vision improved, and the case proved to be one of choroidoretinitis with iritis in its later stage, and secondary glaucomatous symptoms. Later I found spots of deposits on the posterior surface of the cornea—so-called descemetitis. Probably I should have found them at first had I looked for them, but it was primary glaucoma, as first supposed.

In leaving the subject of uveitis, I want to urge the systematic study of Descemet's membrane for these spots. As de Schweinitz, Friedenwald and others have pointed out. they are present nearly always in disease of the uveal tract, and when found in connection with such symptoms, as in the case just narrated, or those of keratitis interstitialis or scleral affections, point to the uvea as the seat of the underlying disturbance.

A number of cases of detachment of the retina, cured by diaphoresis, have been recorded. The method employed in most of them has been to confine the patient to bed and administer sweating doses of pilocarpin daily or on alternate days for six to ten times. Some clinicians have advocated the use of small doses as equally efficacious, and have not thought confinement to bed necessary, except for two or three hours when the treatment was given.

An interesting discussion of the subject can be found in the Proceedings of the British Medical Association held at Montreal in 1897. Mittendorf claimed excellent results "in cases of opacity of the vitreous and especially if associated with detachment of the retina" from the administration three times daily "for a long time" of pills containing 1/100 of a grain each of pilocarpin. Holt of Portland and Burnham of Toronto advocated the use of small doses, preferably by hypodermic injection. The most striking report came from Nettleship, who had a man with complete detachment of the retina, high degree of myopia, and no light perception in either eye. He used pilocarpin, and the result was satisfactory. He could read large type, but he could not say he could hold that.[2]

Many of the reported cases give little data regarding the history and condition of the eye, besides stating that the retina was detached. Alt of St. Louis, however, reported in this discussion the case of a girl with high myopia, in whom the retina had become detached, and had remained so for eleven years after the diaphoretic treatment. Like most oculists who read these reports six to ten years ago, I used the sweating treatment for retinal detachment as opportunity offered. In the class of detachments which is most numerous—in myopic eyes with choroidal atrophies and floating vitreous opacities—my individual experience has been disappointing. It has sometimes occurred to me that maybe a warning given in 1892 by Spalding of Portland might be repeated. In an article in the *Archives of Ophthalmology*, advocating the use of pilocarpin in cases of hemorrhage into the vitreous, he speaks of the possibility of confounding the black appearance of the blood in the vitreous chamber with a detached retina, and insists on confirmation of the ophthalmoscopic diagnosis by field examination and demonstration of a scotoma. Be this as it may, I do not recall ever seeing in my own or the practice of colleagues a permanent cure of retinal detachment in a myopic eye with choroidal atrophy and floating vitreous opacities. Twice I have seen reattachment and improvement—very little—of the field; but they relapsed. Vitreous opacities improve, but this is not cure of the detachment. I have, however, seen three cases of reattachment in eyes which were not myopic and which did not show the chronic degenerative changes observed in the class just under consideration. Acute choroiditis was present in two of these cases, both hypermetropic, and exudate from the choroidal vessels seemed the only explanation of the detachment. Rest in bed with antisyphilitic treatment effected absorption in one. I saw the man several years afterward,

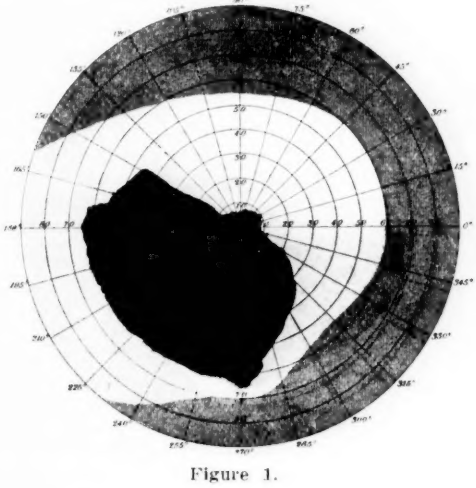

Figure 1.

and the retina was still attached, but that portion of the fundus was blind. Later the eye developed cataract. The patient was first seen in 1889, and disappeared five or six years ago. The other eye remained good. A second case presented, in hypermetropic eyes, double detachment following rapidly the onset of severe choroiditis with floating vitreous opacities. Cause was indeterminable. The case was reported in an analysis of choroidal cases at the Saratoga meeting of this Section in 1902. Pilocarpin was used, with rest in bed. The retinæ reattached, but there was no improvement of vision in the affected field. The only case in which I have seen apparent improvement of vision is now under observation:

A woman, 22 years of age, came into my clinic the second of last March. She had a positive central scotoma in the left eye. The right was normal. A detachment of the retina, apparently involving the fovea and upper and inner quadrant, was made out. Her scotoma on admission is shown in Figure 1, and was practically the same eighteen days later. She was kept in bed, with pilocarpin sweats three and four times a week for four weeks. At that time her scotoma was as seen in Figure 2, and central vision 20/30. I last saw her April 19, nearly three weeks after her discharge, and the condition was unchanged.

2. Ophthalmic Record, October, 1897.

I confess to some misgivings of my own diagnosis, based on comparison of the fields at the beginning and end of treatment. While there certainly was a detachment and as certainly the retina became reattached, I am skeptical about the involvement of the fovea in the detachment. Central vision seems to have improved from nothing to nearly normal, with very little change in the periphery. It would be easy for the upper detached retina to overlap the fovea, and so shut off central vision, at the same time giving the appearance of involving the fovea. The cause of this detachment was a mystery. A few fine muscæ were in a clear vitreous, but there was no other evidence of choroiditis.

I have had no experience in the use of small doses of pilocarpin in retinal detachment, but in a single case of retinitis seen a few years ago I employed such dosage with good effect. The patient was a boy of 12 who presented in one eye a beautiful example of the exudative retinitis, arranged in radiating spokes about the fovea, described by Marcus Gunn at the Edinburgh Congress in 1894. A few small extravasations and mild papillitis completed the picture. Otherwise the boy was in health. Prolonged exposure to glare from snow was the only possible cause I found. After the mercurials and iodids had failed, the administration of

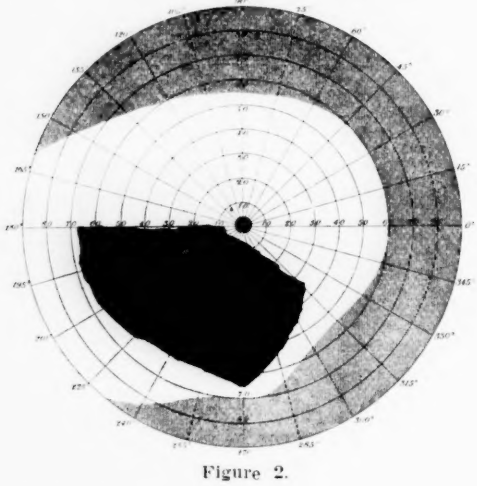

Figure 2.

pilocarpin in one-thirtieth grain doses cleared the exudates in a month.

The good effects accomplished by diaphoresis in general medicine in the treatment of nephritis, effecting elimination of products which should go off through the kidneys, suggests its usefulness in toxic amblyopia. I think one has to be very careful how he draws conclusions here regarding any remedy. For instance, when we were seeing methyl alcohol and Jamaica ginger cases in Baltimore, it seemed that pilocarpin was the only thing which did good, and that its effects were but temporary. Later we found that these transient clearings and cloudings were part of the toxemia. Again, when a toxic agent is withdrawn, the natural tendency is toward cure. Recently a saloon keeper, with typical alcohol amblyopia, came under my care. I wanted him to go to bed and sweat. He said he could not leave his business, but would let whisky alone. He did so, and with no other treatment than abstinence and epsom salts improved in a week from 2/200 to 20/100. Such observations naturally tax one's faith in the efficacy of drugs reported to have brought about identical results. Still, I had another case this winter, a physician, 33 years of age, with tobacco-alcohol blindness, who did not improve for three weeks at his home in a neighboring state under abstinence and strychnia. He had 10/200 when I saw him first, and when he returned for hospital treatment. In two weeks under pilocarpin sweats he improved to 20/40. He wrote me recently that he had stayed well. There is, I think, no doubt that diaphoresis is effective in eliminating toxic products, and its employment in toxic amblyopia is not only justifiable but imperative. The fact that some cases do well without it is no argument against its use. It only calls for more exact study of cases before we make up our minds what we have accomplished by treatment and what has gone on without our help.

While orbital lesions logically come under the class of cases apt to be helped by diaphoretic treatment, I do not know of any special reports. Orbital diseases are, I think, among our rare observations, and when they occur usually indicate some other line of treatment.

Last autumn a woman, 41 years of age, came to my clinic with a right subconjunctival ecchymosis of the lower cul-de-sac. It presented an appearance different from that usually seen, in that the blood formed a definite tumor. She had 20/30 vision. The fundus presented evidence of former disseminated choroiditis. There was no doubt of syphilitic infection. She was put on specific treatment, with heat locally, and instructed to return in two days. When she did the blood tumor was nearly double in size, and there was slight exophthalmos. She was now urged to come into the hospital, as I believed the case to be one of syphilitic disease of the orbital vessels. She did so, and the exhibition of mercurials and iodids for a week did no good. The exophthalmos remained about the same, and the blood beneath the conjunctiva was not absorbed. The external rectus became paretic. I now put her on pilocarpin sweats, given alternate days. After three such treatments improvement commenced, and in a short time all traces of trouble, including that in the rectus muscle, had disappeared.

The case illustrates what has frequently been noticed before, that in syphilis diaphoresis, when indicated by the part involved and symptoms present, is a powerful adjuvant to specific treatment.

CONCLUSIONS.

I would offer these conclusions:

1. The greatest utility of diaphoretics is in the acute congestive and exudative lesions of the uveal tract.
2. Diaphoretics are useful in retinal detachment produced by exudate from choroidal vessels during the course of acute choroidoretinitis. Judging from reported cases, they are also useful in the retinal detachment of high myopia. It is doubtful if restoration of function in the detached retina is usual or permanent.
3. Diaphoretics are useful in alcohol-tobacco amblyopia and probably in other forms of toxic blindness.
4. Diaphoretics influence to a slight extent only, if at all, lesions of the cornea and sclera.
5. Diaphoretics are useless in atrophic and cicatricial lesions.

842 Park Avenue.

The Physician as a Business Man.—Dr. C. U. Collins, in the *Medical Standard*, says that the physician must lay sentiment aside and, like the man in business, keep his income equal to or above his expenditure in order to maintain his credit. The business men from whom he buys expect him to be able to pay for what he buys. If he collects a goodly amount each year, it not only enables him to keep his family comfortable, but it also enables him to buy books, instruments and other accessories that make it possible for him to render better service to his patients, and this is a very good argument to give to his patients for collecting promptly.

DIAPHORETICS AND DIAPHORESIS IN OPHTHALMIC THERAPEUTICS.*

T. A. WOODRUFF, M.D.
CHICAGO.

The enumeration of the more important points in treating pathologic conditions of the eye by means of sweat baths and the most successful means for their application are here attempted. As in other organs of the body, the complete performance of absorption and elimination are constantly going on in the eye without any disturbance of its other functions. When this fails to take place deleterious products accumulate in the vascular and lymphatic systems from the non-elimination of poisons or toxins and pathologic changes manifest themselves.

On what disturbing influences these ocular diseases depend we are still in a large percentage of cases somewhat in the dark. Although syphilis and rheumatism frequently act as predisposing causes they can not be held accountable for all; many of them are probably the result of defective metabolism obscure in origin.

The inflammatory affections, in which we may expect to derive the most satisfactory results from the use of diaphoretics, are those involving the uveal tract. This portion of the globe, by reason of its abundant blood supply, is prone to inflammatory and degenerative changes which show themselves in the form of an exudative inflammation beginning usually in the choroid and less frequently as a catarrhal inflammation of the ciliary body. An endeavor is made by these means to eliminate the toxic or infectious products on which the lesions probably depend. Although a history of syphilis, either hereditary or acquired, can in many cases be elicited, it is not here that our best results are obtained from the use of the sweat-bath alone. It is indicated in just such cases, in conjunction with mercury or potassium iodid, not only as an aid to the absorption of these drugs, but by acting on the skin, helping in their elimination and rendering it possible to give much larger doses without experiencing their untoward effects. It is in those cases of exudative choroiditis which usually come on insidiously, without cause and in patients apparently in good health. The disease manifests itself by ciliary congestion without previous complaint from the patient, but on examination various changes are seen in the interior of the eyeball. The cornea is found to be hazy and on strong illumination Descemet's membrane is found to be covered with a number of opaque dots situated in its lower portion and arranged triangularly with the apex above. If seen in the early stages, and a view of the fundus can be obtained, a number of exudates can be seen situated in the choroid. The choroiditis is probably always the starting point of the uveitis, although in some cases the ciliary body seems to be the initial seat of the disease, beginning as a catarrhal inflammation of the glands situated in this region, according to Treacher Collins. Iritis is usually present, but in many cases is of the quiet variety, the pupil dilating readily with atropin and with little tendency to the formation of synechiæ. The exudates become more abundant until covering Descemet's membrane and rendering the aqueous and vitreous humor cloudy and of such a density that all view of the fundus is obscured. Later on, permanent opacities form in the vitreous and atrophic areas form in the choroid.

While sweating as a means of treating intraocular diseases has been advocated by a number of authorities, it is most useful in exudative inflammations and especially in those of recent occurrence. Diaphoresis by means of pilocarpin has been successfully employed by a number of men of good repute in the treatment of various intraocular affections, especially the inflammatory diseases of the uveal tract, while some few have reported cases in which marked benefit has been derived from such treatment. Among others of the earliest writers who advocate this method of treatment may be mentioned Weber,[1] Scotti,[2] Schmidt-Rimpler,[3] Landsberg[4] and deWecker,[5] who obtained favorable results, and in some cases where other remedies had failed, in cases of chorioretinitis with vitreous opacities, and recommended it as highly efficacious in the treatment of such disorders. Fuchs[6] used the sweat bath promoted by pilocarpin for the absorption of serous as well as of organized fresh exudations, and reports having successfully treated several cases of detachment of the retina. In his experience it was ineffective in old opacities of the vitreous and in neuroretinitis. Of more recent date J. A. Spalding,[7] Hansell,[8] Burnham,[9] de Schweinitz[10] and myself[11] have written of the advantages to be derived from the use of diaphoretics in the treatment of certain exudative intraocular inflammations and as an adjunct to other drugs, especially mercury and potassium iodid, and in the elimination of the toxic and infectious products on which these diseases probably depend.

Although sweating is a useful remedy in many inflammatory affections of the eyeball, especially those of a low-grade character and those involving the internal structures of the globe, I by no means wish it to be understood that such affections are to be combated by this means alone, although a fair number of cases have been met with in which not only marked improvement has taken place without the use of any other medication, but the disease has been brought to a successful termination. In exudative choroiditis I have found diaphoresis usually assisted by the subcutaneous administration of pilocarpin hydrochlorate, very useful in the early stages before there is any involvement of the retina previous to the appearance of patches of atrophy, as in this advanced stage of the disease very little improvement of vision can be expected, but even then the further progress of the disease may be checked and useful vision be retained. It undoubtedly has a beneficial influence in the absorption of choroidal exudates and in allowing the affected tissues to resume their activity, and we can safely encourage the patient in the hope of a favorable termination of his symptoms.

In vitreous opacities very gratifying results can be obtained in many cases from the use of the sweat bath alone, the opacities becoming readily absorbed and the vitreous clearing up. In the recent cases, where the opacities are small, although the vitreous may be so cloudy that the details of the fundus are made out with

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Ophthalmology, and approved for publication by the Executive Committee: Drs. Frank Allport, John E. Weeks and R. L. Randolph.

1. Weber: Centralblatt für Med. Wissenschaften, 1876.
2. Scotti: Berliner klin. Woch., 1877, No. 11.
3. Schmidt Rimpler: Berliner klin. Woch., 1878, No. 24.
4. M. Landsberg: Philadelphia Med. Times, 1878-9, vol. ix, pp. 345, 369.
5. deWecker: Graefe-Saemisch Handbuch der Gesammten Augenheilkunde der Ophthalmologie, vol. iv, No. 2.
6. E. Fuchs: Wiener med. Woch., Nos. 37 and 38.
7. J. A. Spalding: Arch. of Ophthalmology, April, 1892.
8. Hansell: Ophthalmic Record, vol. vi, No. 12, p. 668; Philadelphia Polyclinic, Nov. 20, 1897.
9. G. H. Burnham: Ophthalmic Review, 1897, vol. xii, p. 259; Arch. Ophthal., 1898.
10. G. E. de Schweinitz: Therapeutic Gazette, 1892, vol. viii, p. 436; Ophthalmic Record, 1898, vol. vii, p. 85.
11. T. A. Woodruff: THE JOURNAL A. M. A., October, 1902.

difficulty and visual acuity is very much lowered, there is usually a rapid clearing up of the exudates and visual acuity, if not fully restored to normal, may be greatly improved, so that useful vision is obtained.

In cases of long standing and where the opacities appear as large, dark, irregular masses, the degeneration has been too extensive to expect much improvement from any treatment, and in such cases the prognosis is less favorable. In elderly people, even when the disease is of recent occurrence, the prognosis is not so favorable, still the progress of the degeneration may be checked and absorption of a considerable portion of the exudate take place with retention of a useful amount of visual acuity. It is in the young individual that most favorable results are to be looked for.

In hemorrhage into the vitreous more favorable results are to be looked for where the extravasations are small, in which case complete absorption may take place. In the larger hemorrhages more permanent opacities are apt to remain in spite of treatment. In detachment of the retina I have not seen any favorable results from the use of diaphoretics.

In toxic amblyopia diaphoresis materially aids in the elimination of the toxic agent, but it is very difficult to estimate its true value as a curative agent, and as such its value is very doubtful.

METHOD OF ADMINISTRATION.

As to the technic employed in getting the patient into a profuse perspiration, the baths should be given when the stomach is empty, as being less liable to produce any untoward effects, this being especially the case when pilocarpin is to asist in the production of the sweat. The patient should be in bed and wrapped up to the neck in a blanket and again covered with at least four blankets. Under the latter half a dozen quart bottles containing boiling hot water should be placed. If used at all, pilocarpin should now be given hypodermically, beginning with one-tenth to one-eighth of a grain, the dose of which can be increased if considered necessary to produce a more profuse perspiration, but usually a larger amount of the drug is unnecessary and not at all essential to the success of the treatment. The patient is now given to drink at least a pint of hot water, weak, sour lemonade or tea. In a few minutes he should begin to break out into a profuse perspiration, which should continue for at least two hours, only stopping short of that time if he shows any bad symptoms. At the end of the sweat he should be thoroughly dried and the skin rubbed with alcohol and then allowed to rest the remainder of the day. This treatment should be continued at least every other day until twelve baths are taken. At an interval of two or three weeks a similar course of treatment should be repeated, and then continued at various intervals so long as necessary. It is important that the treatment be carried out systematically and at regular intervals if we desire to get results.

DISCUSSION

ON PAPERS OF DRS. WOODS AND WOODRUFF.

DR. W. B. MARPLE, New York City, agreed with Dr. Woods that if therapeutic nihilism is bad, undue therapeutic enthusiasm is worse. Dr. Marple said in regard to the use of diaphoretics that the unwillingness of patients to undertake the treatment often deters physicians from using it in what would be suitable cases. The practice of Dr. Kipp in this regard is a most excellent one. When he has a case where he thinks it indicated, instead of going through the troublesome methods in the hospital he sends the patient to a Turkish bath establishment, and Dr. Marple thinks that is a very good idea. Diaphoretics are useful especially in cases of disease of parts abundantly supplied with blood vessels; all forms of uveitis of an acute character. The more chronic conditions are not so much benefited. The unwillingness of the patients to subject themselves to the sweat-bath has led Dr. Marple to use the salicylates, and while the beneficial results may not be so great in this way, still they have a very useful action. He agreed that in most cases the withdrawal of the poison is the most important element, although he can readily see that the addition of diaphoretics may be of distinct advantage. He was recently interested in seeing a child who had been poisoned by instillation into the eyes of atropin drops. The child was violently delirious and it was not until it had been given a good sweat-bath that it quieted down and went to sleep.

DR. WALTER L. PYLE, Philadelphia, said that he is a firm believer in thermotherapy and in hydrotherapy, but he protested against the promiscuous employment of hypodermic injections of pilocarpin, and considers it a very dangerous procedure. He knows of one case in which the patient never recovered, and it seems to him that such a dangerous procedure should not be recommended. It is true that this patient had an advanced nephritis, but all these patients have either visceral disease or profound disturbances of the circulation or of metabolism. In his practice, to produce diaphoresis, he employs the Turkish bath, hot-water bottles, hot blankets, hot drinks, etc. There is one drug that he uses frequently—that is Dover's powder. He has never seen any bad results from it, and the patients all seem to do better when it is given. It has a quieting action that is beneficial. He is afraid of the massive doses of salicylates that are recommended by some to produce profuse sweating, although he generally uses one of the salts in rheumatic cases. Another point regarding the use of heat in his practice, when he can not dilate the pupil in the ordinary way, is to order hot fomentations and to instill the atropin solution hot.

DR. A. TIMBERMAN, Columbus, Ohio, said that in regard to the matter of undue enthusiasm for certain remedies, he thinks that some are not enthusiastic enough. One man thinks pilocarpin does no good and another pins his faith unreservedly to it. A patient with toxic amblyopia may get well without pilocarpin, and again he may not get well and the amblyopia may persist even though the toxic agent is withdrawn. A case of uveitis may progress for months without any apparent cause and get progressively worse and then, with the administration of these remedies, excellent results may be obtained. Recently a man who for six months previously had noticed a failure of vision in his left eye, consulted Dr. Timberman. He could make nothing out of the fundus appearance; there was a great black mass over the pupillary area which precluded any examination of the fundus whatever. He did not suppose he could do any good, but he put the patient to bed and gave increasing doses of pilocarpin. He always begins with small doses and runs up as high as the patient will stand. He is never afraid of the drug when he handles it himself. The results were very satisfactory.

DR. WENDELL REBER, Philadelphia, rose to the defense of pilocarpin. He said that it has the function of eliminating toxic material from the system and there is relatively little danger from its use if the condition of the patient's heart be studied beforehand and that, of course, is all important. He is careful to begin with 1/12 the first day, then 1/6 and on to 1/4. Treated in this way there is no danger. He feels that there is no more valuable adjunct to the treatment of iritis than pilocarpin. He agreed with Dr. Pyle that it is advisable to give stimulating drinks. In uveitis and in exudative choroiditis its value can not be overestimated. Patients who would not stand more than 20-gr. doses of iodid of potassium or sodium will tolerate much larger doses with pilocarpin treatment.

DR. S. C. AYERS, Cincinnati, said that for some years past he has been using the hot-air cabinets instead of pilocarpin. They produce a diaphoresis which can be regulated to any desired effect. They are entirely free from danger and the results are quite satisfactory.

DR. LEARTUS CONNOR, Detroit, Mich., declared that in the present condition of medical knowledge the use of hot air and

hot water has come very nearly to an exact science. The trouble is that physicians do not always have the appliances for using these in accordance with their advanced knowledge. The physicians in Boston about a year ago established an institution by which they are able on prescription to have hot water and hot air used exactly as they want it. And in many cities a similar plan might be adopted. They are the best diaphoretics and their intelligent use is without any risk. Where is the hospital that has proper appliances for the use of these valuable agents? In the conditions that have been mentioned, when Dr. Connor can secure the proper application of these remedies, excellent results have been obtained.

DR. E. E. HOLT, Portland, Maine, said that in the discussion of this subject in Montreal he referred to a case of myopia with detachment in which pilocarpin was used and there was a complete cure. There were eight diopters of myopia. He followed the case twelve years and there was no relapse in that time. He used hypodermic injections, beginning with small doses. He has never seen any bad effect from the use of pilocarpin.

DR. J. L. BORSCH, Philadelphia, stated that he has had most excellent results with pilocarpin injections, though, of course, cases must be thoroughly examined before instituting this or any form of treatment, and he would not advise the promiscuous injection of pilocarpin. He finds that cases of toxic amblyopia stand pilocarpin very well.

DR. F. BULLER, Montreal, said that he thinks there must be a certain amount of enthusiasm if anything is to be accomplished. Pilocarpin has been ably defended, but some unkind things have been said about the salicylates, and Dr. Buller thinks it only right that some one should defend them also. He has used the salicylates freely in uveal troubles and is convinced that they are very useful in these cases. Recently he had an illustration of this. In a severe attack of iritis following cataract extraction the patient was treated with the salicylates and with atropin, and in three or four days was entirely well. In another case, one of sympathetic ophthalmia, where the disease appeared to be steadily progressing in spite of everything, he put the patient on the salicylates and he commenced to improve immediately. The improvement was so marked that in a few days one could not tell from a casual glance that anything had been the matter with the eye, though it actually had been much inflamed for several weeks. Dr. Buller advocated the use of the salicylates at least in certain inflammatory affections of the uveal tract.

DR. HIRAM WOODS, Baltimore, said that when any one says that white atrophy of the optic nerve, choroidal atrophy and like destructive lesions can be cured by sweats produced by diaphoretics or by external agents, that person is indulging in a pretty gross form of enthusiasm. Dr. Woods agreed in general with Dr. Pyle concerning the dangerous possibilities of giving large doses of pilocarpin. A small tentative dose should be given at first, maybe not over a twelfth of a grain. Some patients are susceptible to the remedy and show marked reaction; others resist even large doses. Dr. Woods recently saw in consultation a young lady with acute otitis media, and was told that she had had no physiologic reaction from doses of a sixth, a quarter and a half grain. The patient's age is another consideration. The only serious depression Dr. Woods ever observed was in a man over 60 with organic heart disease, who never should have had the drug. Moderately severe vesical pains followed its use in another case, but these are the only instances of trouble Dr. Woods has observed. Dr. Pyle's method of using atropia in obstinate cases of iritis is most useful. Heat is certainly an adjuvant to atropia. Diaphoresis has not in Dr. Woods' experience helped senile or disseminated choroiditis. The exudative choroiditis, with deposits on the posterior surface of the cornea, so-called descemetitis, as described by Hills Griffith in Norris and Oliver's System, is the form of disease which is most benefited.

DR. T. A. WOODRUFF, Chicago, said that he has never seen any bad effects from the hypodermic use of pilocarpin. He always gives small doses unless it is difficult to get the patient to sweat; then he increases the dose; generally gr. 1/10 to 1/8 is sufficient. He has found it unsatisfactory to give the patient the cabinet bath at home. In a hospital, with a nurse to handle the patient, good results may be obtained.

THE CONSERVATIVE MANAGEMENT OF LACHRYMAL OBSTRUCTION.*

S. D. RISLEY, M.D.
PHILADELPHIA.

It is by the request of the chairman that I venture for the third time to present my personal views as to the value of conservative methods in the treatment of lachrymal obstruction. Added experience has served to confirm the conviction that, in many cases, the practically incurable affections of the tear duct so frequently observed, have been produced through faulty technic or by the violent surgical measures adopted at the outset of treatment. In my early experience I approached the treatment of lachrymal retention with a doubtful prognosis; but of late years I entertain this feeling of doubt as to results only in cases which have already been subjected to some form of radical surgical treatment having in view the creation of a patulous nasal duct.

It is probable that a normal duct is never patulous, but that the tears escape into the nose from the lachrymal sac by capillarity aided by gravity, and possibly by muscular pressure on the sac exerted by the act of winking. It is the opinion of some that a vacuum is caused in the empty sac by this pressure and that the tears are sucked or drawn into it through the puncta and canaliculi from the lake formed at the inner canthus. The drainage system according to this view is therefore a pump forcing the tears forward into the nose.

The onward course of the tears may be obstructed in any part of the apparatus. The puncta, one or both, may be closed entirely or partially as the result of abnormalities or by chronic disease of the conjunctiva or lid margins; the lumen of the canaliculi at the same time may be obliterated or diminished; the lachrymal sac may be diseased and its cavity closed by hypertrophy or by the swelling of its surrounding tissue caused by a phlegmonous inflammation; or the peculiar tissue lining the bony nasal duct, may be so changed by disease as to close its caliber and so obstruct the escape of the tears from the lachrymal sac. Lastly, the form of the nasal duct may be such as to render it susceptible to obstruction by even slight causes. It is probable that the majority of cases of lachrymal retention belong to this last class.

When the cause of the retention lies in the puncta or canaliculi, gentle dilation after cocainization is usually sufficient to effect a cure. If the sac is diseased it will usually be found necessary to slit the lower canaliculus to secure a more ready access to the sac and the nasal duct for the purpose of subsequent treatment.

In relatively few cases it will be found that the inflammation of the sac, dacryocystitis or blennorrhea, exist without any marked stricture of the nasal duct. If any obstruction exists it is apparently due to swelling or thickening of the sac itself which readily closes the valve-like entrances to the duct. If the entrance to the duct is narrowed, the egress of the tears is prevented by the increased proportion of mucus or mucopurulent material formed in the sac, or entering it from the con-

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Ophthalmology, and approved for publication by the Executive Committee: Drs. Frank Allport, John E. Weeks and R. L. Randolph.

junctiva. After thorough cleansing, a few drops of a 4 per cent. solution of cocain, followed by adrenalin, will contract the swollen or edematous tissues in a few moments, so that fluids will readily pass into the nose from the canula of the lachrymal syringe, and that without first probing the nasal duct, a procedure which should be avoided whenever possible. When fluids can be made to pass into the nose freely, the inflammations of the sac and nasal duct will readily recover and I believe more speedily and with better final results than when the already inflamed tissues are subjected to traumatism by probing.

In purulent affections, the sac can be readily cleansed by solutions of peroxid of hydrogen and the inflamed surface treated by weak nitrate of silver solutions, sulphate of zinc or, in chronic affections, by solutions of tannin and glycerin, with iodin. These should not be allowed to remain in the cavity of the sac, however, but made to pass through it into the nose, and the surface subsequently washed with boracic acid or salt solutions. Many of these cases I often treat without ever passing a probe into the nasal duct.

In long standing disease, however, the lining membrane of the nasal duct becomes thickened and may quite close its lumen at one or more points in its course, usually at the bottom of the sac, i. e., at the entrance into the duct, or the entire course of the duct is apparently closed by swelling or a hypertrophy of the soft tissues, in which case probing becomes necessary. It should be undertaken with caution, having in mind the peculiar anatomy of the tissues lining the bony duct. A system of abundant veins surrounds the duct in its bony canal, which Dwight, quoting Henle, cites as an instance of what he calls compressible cavernous tissue, which gives support to the walls, and probably when congested can quite compress the cavity.

When we consider the variable and irregular form of the bony duct, it is obvious that the probe, impinging on a bony angle, may very readily be made to penetrate the soft tissue and so pass between it and the bony wall, causing profuse hemorrhage by injuring the bloodvessels, the traumatism doing more harm than the original disease. I am convinced by many of my earlier experiences that, in some cases which would have been readily curable by other and milder measures, more or less permanent and troublesome strictures of the lumen of the duct had been caused by this accident. It certainly can be avoided in most cases by filling the sac with cocain solution and adrenalin chlorid, which, as the tissues contract, will pass into the duct, so that after the lapse of ten or fifteen minutes, the probe can be cautiously passed through the duct to the floor of the nose. Too fine a probe should not be selected. Numbers 3 and 4 of Bowman's series are less likely to penetrate the mucous membrane than numbers 1 and 2. The design in using the probe should not be to rend or tear a stricture, as in urethral surgery, but to compress the tissue between the probe and the bony walls of the canal, where it should be allowed to remain from fifteen to twenty minutes. By this means the absorption of the thickened tissue can often be effected, much as the indurated edges of a leg ulcer are reduced by firm strapping. After withdrawing the probe the duct may readily be treated with suitable astringent washes applied by aid of the lachrymal syringe.

I have found much caution necessary in slitting the canaliculus as a preparatory step to subsequent treatment. I invariably employ for this purpose the probe-pointed knife of Weber, and am careful not to carry the incision into the sac, since to do so is to destroy the admirable function of the part, that of a pump.

The drainage duct throughout should be regarded not as an open drain pipe, but as a delicate and most ingenious mechanism, the operation of which may be readily destroyed by bungling interference. The canaliculus should therefore be slit only to its junction with the common canal. The probe or canula of the lachrymal syringe can then be passed into the lachrymal sac and carried into a vertical position without the injury which would result from passing it through the uncut canaliculus.

Great care is often necessary to avoid passing the probe-pointed knife through the floor of the canaliculus at its junction with the common canal. I have many times seen patients where this has occurred and a false passage made. The results of this accident are extremely difficult to remedy, as I know from many attempts to do so; therefore it should be sedulously avoided. It can usually be prevented by carefully straightening the canaliculus by dragging the lower lid strongly toward the temple. The probe point of the Weber knife can then be carried forward to the nasal wall of the sac, when all tension on the lower lid will cease. In cases of acute dacryocystitis or phlegmon of the sac, with great swelling, the direction of the opening of the canaliculus into the sac is displaced, so that the operation of slitting should be deferred until the swelling has subsided under cold compresses, or by opening the abscess through the skin and by subsequent treatment through the incision. Without this precaution it is difficult to avoid making a false passage, which under the existing circumstances is likely to lead to a pus pocket, and subsequent contraction and permanent displacement of the opening into the sac. After the parts have gained their normal relation the canaliculus can then be slit safely and the final treatment of the sac and nasal duct conducted through it, and the opening through the skin be permitted to close.

There is another group of cases which present peculiar difficulties for their successful treatment, and while presenting the general characteristics of those already mentioned, are important because of their etiology.

Any careful study of the anatomy and physiology of the parts involved in lachrymal obstruction, and of the contiguous bony cavities in the anterior segment of the skull, either in dried or wet preparations, reveals marked variation in structure. One does not go far in such an investigation without being impressed by the idea that the anomalous relation of these anatomic structures may be in large measure responsible for the tendency to disease of the tissues composing the delicate lachrymal drainage apparatus.

It is obvious from any extended inspection of a collection of skulls that not only is the size and shape of the bony orbits modified by distortions of the skull, but the nasal passages and the accessory sinuses undergo marked variation in size and form, and in the relation of their walls to contiguous structures. In a number of specimens I have seen the direction, size and form of the nasal duct changed by the encroachment of the inner wall of the maxillary antrum.

In one patient, a woman, who had been treated for a long time by a general surgeon for lachrymal obstruction, I found that in his efforts to secure a passage into the nose the probe had been forced into the sac through

the floor of the canaliculus and thence downward through the walls of the maxillary antrum, failing entirely to reach the floor of the nose. In my efforts to relieve the condition I found that unless the point of the canula were carried beyond this false passage, the fluid from the lachrymal syringe would flow into the antrum. By changing the direction of the canula the contents of the syringe flowed freely into the nostril. She had suffered from a chronic rhinitis for many years and had a deflected septum and ethmoidal disease. Her lachrymal disturbance was no doubt primarily due to the nasal condition. By skillful treatment of these, and by simple syringing of the sac and nasal duct, a cure could readily have been secured; whereas a condition of affairs had been produced, which was curable only by some radical surgical procedure to which she would not submit.

In cases of blennorrhea of the sac, with a large nasal duct through which a relatively large probe can be passed, I have usually found that the retention of tears was due to obstruction at the nasal end of the duct through disease of the soft tissues or some deformity of structure at this point. The passage to the floor of the nose does not always end with the bony duct, a fact which suggests both the futility and absence of any necessity for harsh probing or other surgical measures. In one case in which a No. 8 probe of the Bowman series passed without difficulty, and where washes flowed freely into the nostril, the patient nevertheless had constant retention of tears and mucus and a chronic conjunctivitis, which demanded more or less constant treatment. The bony duct was a short one, but opened as a narrow slit under a broad fold of membrane back of a scroll-like inferior turbinate, which hugged closely the wall of a very narrow nostril. In all cases of lachrymal retention, therefore, no study should be regarded as complete which does not include a careful inspection of the nostrils.

In this connection, however, it should be borne in mind that lachrymal disease is rare when compared to the great frequency of the affections of the nose. That the nasal disease does not more frequently cause obstruction of the outflow of the tears, I believe is explained by the protection afforded by the constant and ready exit of the tears under normal anatomic conditions of the lachrymal duct. Given cases of abnormal anatomic structure, as, for example, the absence of the valve-like fold protecting the opening of the duct, or a slit-like exit which is readily closed; or some of the abnormal irregularities in the course of the duct itself, and we have anatomic conditions which, even in health, introduce more or less difficulty in the escape of the tears and render such cases susceptible to closure by disease.

When we consider that the mucous membrane forming the nasal duct lies in a bony canal, which is subject to great anatomic variations in size and form, with great irregularities in its walls; that between the periosteum lining and the mucous membrane forming the tear duct, there is a small amount of intermediate tissue in which run veins of considerable size which are connected with the plexus of the inferior turbinates in the nose, it is obvious that we should at least hesitate before we plunge forcibly through this duct instruments which can only hopelessly injure the admirably contrived apparatus for the drainage of the tears. Such surgical procedure should be adopted only when other means have failed. My own experience seems to show that this is comparatively rarely necessary.

DISCUSSION.

DR. G. E. DE SCHWEINITZ, Philadelphia, stated that, in large measure, he agreed with Dr. Risley and commended the conservative measures which Dr. Risley adopts in the treatment of these cases. Dr. de Schweinitz considers it deplorable that epiphora alone has been made too often the indication for the introduction of probes, when in point of fact there has been no fault in the drainage system to account for the overflow of tears, which may be due to many causes—exophoria, uncorrected presbyopia, refractive error and some functional as well as organic nervous diseases. Such cases, to be sure, do not come into the discussion at the present time. In the presence of a stricture of the lachrymo-nasal duct, Dr. de Schweinitz thinks it may be necessary to use a probe, but his experience agrees with that of Dr. Risley, that large probes do not yield satisfactory results. So often continued overflow of tears is due to coexisting intranasal disease, and especially to obstruction at the intranasal end of the duct, that this region requires the closest scrutiny and the most accurate treatment. This often yields the happiest results and without the necessity of interference with the delicate drainage apparatus. In the presence of dacryocystitis, when the sac has been long inflamed and its walls are thickened, probing seems to be unnecessary when by the simple operation of extirpation of the sac a radical cure may be effected that is usually a satisfactory one.

DR. L. D. BROSE, Evansville, Ind., stated that there are some cases where he does not feel like trying conservative treatment. One is where one eye has been lost and there is a suppurative condition of the other tear sac. There the patient runs a risk of losing the other eye. Again, where the patient has had a severe septic ulceration of the cornea in one eye and the disease has been cured and then the same trouble starts in the other eye. In these cases the lachrymal sac should be removed. Where the sac is repeatedly inflamed and the probing is very painful Dr. Brose resorts to the radical operation of removal of the sac.

DR. E. J. BERNSTEIN, Baltimore, said that he tried, in 12 skulls, to pass the larger probes and found three adult skulls through which it was impossible to pass them. In trying to pass the largest ones, he found that this was only possible by fracturing some of the small bones. This year he has had two or three cases which have been under the care of men using large probes for the treatment of chronic lachrymal sac troubles, in spite of which the tear drop had persisted. It was found on examination that there was an enormous hypertrophy of the turbinates which had been entirely overlooked. In some of the more chronic cases, Dr. Bernstein has been doing the radical operation of removal of the sac. Instead of doing the usual operation, as recommended by Petit, he goes through the skin only and lays bare the sac. In that way he dissects it out more readily and thoroughly.

DR. MAITLAND RAMSAY, Glasgow, Scotland, agreed with Dr. Risley regarding the conservative treatment of lachrymal diseases. Dr. Ramsay was taught to use probes frequently in these affections, but gradually, as his experience became greater, he has come to employ probes only in special cases, and to teach that the less probing the better in the treatment of diseases of the tear passages. Of course cases occur now and again in which there is an organic stricture in the nasal duct, which can only be overcome by the use of a probe. Under these circumstances it is his practice to administer an anesthetic (usually nitrous oxid gas), slit the lower canaliculus, pass a No. 6 probe into the nasal duct and then introduce a lead style, which is kept in position for at least 24 hours. At the end of that time the style is removed and the sac and nasal duct syringed thoroughly with an antiseptic solution. If the obstruction has been difficult to overcome, the style is reintroduced and is worn as long as may be necessary to effect a cure.

DR. SAMUEL THEOBALD, Baltimore, said that, from his point of view, one of these questions is as definitely settled as the other. A radical error is made in supposing that the normal condition of this apparatus can not be disturbed without

serious consequences. For the proper performance of its function it is not necessary to have a punctum or a canaliculus in its normal condition, nor is it necessary to have the valves which are commonly present in the nasal duct. Dr. Theobald does not know of any operation that gives more satisfactory results than slitting the canaliculus for eversion of the punctum. If it is necessary to preserve the normal state of these parts this certainly would not be the case. He has had considerable experience in the last twenty-five years or more in the use of the large probes and he states most emphatically that the normal physiologic function is not spoiled. He meets with patients whom, in some instances, he has not seen for ten or fifteen years and finds them absolutely cured. The ducts are pervious, as may be shown by the Valsalvian experiment. They may be abnormally pervious to air, but that is of no moment. Dr. Theobald considers Dr. Risley's experience singular in that all his troublesome cases had first been dealt with by other men, who had made them worse. He thinks that Dr. de Schweinitz uses probes of inadequate size.

DR. E. E. HOLT, Portland, Maine, said that he interviewed the men at the Seventh International Congress, held in London in 1881, and that it was very interesting to learn what a difference of opinion existed in regard to the treatment of dacryocystitis. Dr. Holt's plan has been for the last twenty years, in cases of suppuration that he could not cure by syringing, to slit the canaliculus and pass the large Theobald probes and then to put in a lead style to fit the case. He does this to avoid repeated probing and he is so well satisfied with the treatment that he has followed it for years.

DR. W. H. WILDER, Chicago, recalled a discussion some ten years ago in this section, when almost all the men advocated probing. At that time the conservative treatment of washing out the sac did not seem to be so well received. Dr. Wilder thinks, with Dr. Risley, that such conservative treatment in recent cases is the proper one and will prevent many from going on to impervious stricture of the duct. He is coming to believe that for those chronic cases that require regular probing, and that have received such measures from the hands of other practitioners, the most conservative treatment is the radical one of excision of the lachrymal sac and duct. If there is no need of the valves, or canaliculi, as Dr. Theobald says, then there is no need of the sac itself. When this is inflamed it is a constant source of irritation that is of itself enough to cause profuse lachrymal secretion. This all subsides when the sac is excised, and he does it more and more, not only for the relief of such irritation but for the prevention of infection of the cornea. A little method that facilitates the operation is to inject into the sac just before the operation liquid paraffin of a melting point of 112°, which is then chilled at once with ice; the dissection can then be carried on with greater ease and accuracy.

DR. S. D. RISLEY stated that he has simply given his own experience and candidly stated his own judgment. The subject of probes, or of no probes, is not under discussion at all, as has just been pointed out by Dr. Reik. The cases where the probe does do good are those where the skull is very large. Under such conditions large probes may be useful, through pressure causing absorption of thickened tissue by stimulation. This is probably the only way in which probes do good. It is bad surgery to repeatedly pass large probes through a duct that is so small that the friable, bony structures must be crushed. Where the duct is large, the trouble is apt to be due to disease in the nasal passages at the lower end of the duct, which, through thickening of the surrounding parts, becomes closed, the lumen of the bony duct becoming secondarily involved by extension or through retained tears and the contents of the conjunctival sac. There are many cases that are stubborn in spite of and possibly because of continued probing which recover rapidly as soon as the probes are omitted and gentle syringing substituted. Given a case of acute dacryocystitis, if treated in the way suggested, often without even slitting the canaliculus, it will prevent them becoming cases of chronic blennorrhea of the sac. At one time in his clinic, Dr. Risley often found it necessary to have patients with lachrymal disease await their turn for the probes. There were not enough probes to go around. Now one rarely sees a probe in use in his clinic and the lachrymal cases no longer accumulate as in former years.

SOME INJURIES OF THE EYE IN THEIR MEDICOLEGAL ASPECT.*

JOHN JOHNSON KYLE, M.D.
INDIANAPOLIS.

For me to submit a paper on the medicolegal aspect of injuries of the eye in general would be rank temerity. My efforts will be especially directed to two interesting cases of injuries of the eye, with reference to the medicolegal aspect of one of them in particular.

Exaggeration of injuries and feigning seems to have taken its origin in the early dawn of man's existence. Erichsen, of London, in 1866 published six lectures on obscure injuries of the spine due to collision on railroads. Since that time thousands of cases of obscure nervous and physical disorders have been correctly and incorrectly attributed to trauma.

Unfortunately, it is necessary in a consideration of obscure sequences of accidents that we remember the weakness of human nature and draw conclusions from conditions as they really exist, rather than try to prove facts from abstract conditions.

The point I wish especially to make is that in cases of injury of the eye, obscure or otherwise in origin, occurring among employes of great corporations, soldiers, sailors, passengers of steamships or railways, we should exercise precaution in all we say regarding such injuries, not alone to patients, but also to interested corporations.

Wounds of the eyeball may be classified as direct and indirect. Direct injuries are punctured, contused, lacerated, incised and gunshot. Among the indirect are especially injuries from concussion, which may result from fall, blow on the head or gunshot wound. Direct injuries are of interest on account of their varied causes and the great spectacular forms presenting.

The greatest danger from such injuries is infection and sympathetic ophthalmia. The danger of infection is, as a rule at the present time, in direct ratio to the time the patient is seen by the surgeon. It may be a reiteration of an established fact that many foreign bodies strike the eye and even enter without bringing about inflammatory change, due to the early, careful and antiseptic treatment of the wound, to feeble pathogenic property of bacteria found in conjunctiva (Randolph) and to the bactericidal properties of the secretion of the eye. On the other hand, sterile bodies as copper may excite suppuration, as related by Leber, Kostenitschi, Kipp and Meyers (Baudry), the inflammation being of a chemical origin. Foreign bodies which are not susceptible to the chemical properties of the secretion or fluids of the eyeball may remain in the eye, innocuous for years and often a lifetime.

Injuries of the eye from cuts, foreign bodies or contusion are of greater interest when enucleation is not immediately indicated. With the introduction of the magnet favorable results in the extraction of steel and iron are daily recorded. Subsequent loss of eye months afterward from cicatricial irritation and inflammation may follow, as a report of the following will show:

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Ophthalmology, and approved for publication by the Executive Committee: Drs. Frank Allport, John E. Weeks and R. L. Randolph.

Mr. A., an employe of the Atlas engine works, was referred to me by Dr. Dorsey, surgeon. Patient struck by particle of steel ⅜ in. wide 7/16 in. long, weighing 20½ grains.

The track of the wound was through the upper lid, slightly below the supraorbital bone and in the median line; the object penetrated the orbit 1/16 of an inch back of the sclero-corneal margin, making an irregular clear-cut antero-posterior wound. The large particle of steel was extracted by a Johnson magnet. Had we used the giant magnet the probability is that a great deal of the vitreous would have escaped, with possible collapse of the eyeball. As it was, there was but little loss of the vitreous. Two stitches were taken in the eyeball and three in the lid; healing by first intention took place with vision 20/30. No measurements, unfortunately, were taken of the field of vision.

Seven months after discharge of patient he returned and gave a history of slight pain and progressive loss of sight for a period of three months.

Vision was reduced to perception of light. The eye was very much injected, soft and tender to the touch. The iris was bulging on a line with the wound as though propelled by a foreign body. On account of the cloudiness of the vitreous, ophthalmoscopic examination was negative. Suspecting the presence of a melanosarcoma, enucleation was advised and accepted.

Operation.—On puncture of posterior chamber with needle previous to hardening with formaldehyd, a thin, turbid fluid of a reddish color escaped. On section, the retina and the flat portion of the ciliary body was found to be drawn into the scar two- to three-tenths of an inch. The gradual cicatricial contraction produced detachment of the retina and caused the lens and capsule to be drawn upward and by pressure at the point of contact, produced atrophy of the ciliary body and iris. The suspensory ligament at its lower portion was completely ruptured. Until fibrous tissue was fully formed in the scar there was no contraction or detachment and thus we had a good vision for a few months following the injury.

The lens is observed to be degenerated, the upper portion being filled with hyalin material. Cyclitis was in process of development, which in a short time would have brought about a general panophthalmitis.

As regards the magnet, I might repeat that Professor Schmidt-Rimpler prefers the large Haab magnet to the small Hirschberg magnet, except where foreign bodies are in the anterior chamber. If they are embedded in the iris, there is great danger, in using the Haab magnet, of pulling the iris out with the foreign body. In such cases Professor Schmidt-Rimpler[1] recommends exsection of the iris, and that the Hirschberg magnet be used to complete the operation.

Wounds by contusion are of interest from a medico-legal standpoint especially when there is no hemorrhage into or rupture of the membranes of the eye. In such cases we may have a condition of traumatic anesthesia of the retina or molecular shock (Baudry) as described by Leber, Berlin, de Schweinitz and others, resulting in total temporary blindness or permanent partial blindness. In such cases we may have contraction of the field of vision, with good central vision and with total absence of objective symptoms.

The attending oculist or medical expert called by the court may be asked to testify in damage suits involving thousands of dollars, as to the existence of real or functional blindness

Makin[2] in his interesting book relates a number of cases of contusion produced by bullets causing total blindness. In one case contraction of the field of vision resulted, with symptoms of a lesion involving the upper part of the uncinate lobe about the calcarine fissure. In this case in particular he says: "I feel satisfied that there is considerable loss of sight in the right field also, but the functional element obscures its exact nature."

Among the indirect injuries to the eye, I desire to dwell especially on those classified as due to concussion. It is difficult to always differentiate certain nervous conditions of the eye, classified as concussion, from those produced by contusion.

Concussion of the brain as described by DaCosta and others, "is a force that shakes, oscillates or jars the brain, giving rise to waves of cerebral fluid." Such waves may be transmitted to the fluids of the optic sheath, resulting sometimes in hyperemia of the nerve, either unilateral or bilateral, and occasionally passive blindness. Hysterical amblyopia may result from concussion of the brain, not alone from hysteria, but many latent nervous diseases may be hastened by concussion (Bailey).

To differentiate between feigning, hysterical amblyopia and concussion is indeed a difficult problem, especially when the blindness is bilateral. Blows or injuries on the periphery of the orbital wall or on contiguous bones of the face, may bring about concussion of the eyeball and nerve, producing temporary blindness and even slight permanent alteration of sight. Where we have no direct injury, vibratory force or possibly stunning is, without doubt, the cause of the loss of sight.

L. M., manufacturer by profession, while en route from Indianapolis to New York City, was, according to the history of the case, thrown violently from the train while in motion, striking on the forehead and bridge of the nose with sufficient force to cause unconsciousness for three hours. The man was brought to the city of Indianapolis the second day after the accident and confined in one of our hospitals. I saw him two days after the injury. The forehead and nose were badly contused and there was a slight bloody discharge from the nose. Eyeballs normal in appearance. Conjunctiva slightly edematous, tenderness along supraorbital ridge.

The patient said he could not see; could open eyelids normally; no muscular insufficiency of any kind could be detected. Pupils reactive to light. Examination of fundus showed nothing abnormal. Pulse at this time was 60, temperature slightly subnormal, breath fetid.

On the fourth morning the patient said he had suffered, during the night, a great deal of pain at the back of his head. Optic nerves were very much hyperemic and congested. On the seventh day, in addition to the eye symptoms, the patient complained that he could not hear in right ear; tuning fork C. 512 was heard for four inches through the air. The con-

1. Amer. Jour. of Ophthal., February, 1904.

2. Surgical Experience in South Africa.

gestion of the optic nerves after five days began to clear up. In a few days the nerve was quite normal. About this time the patient claimed he could not open his eyelids. The eyeballs were much deflected, resembling paralysis of superior oblique muscles, so much so that ophthalmoscopic examination of the nerves could be made only with great difficulty. The case continued in this condition for six weeks, when I lost track of the patient. At my last examination I emphatically told patient there was no excuse for his not seeing.

Because I, unguardedly, some twenty days after the accident, told the patient and his attorney that atrophy of the optic nerves would probably follow the congestion, the patient brought suit for $100,000 on account of blindness. Six weeks after the injury I read in the paper of a sudden miraculous return to sight in the right eye of my patient, superinduced by accidentally striking his head against some object. Ten days after this injury, in the presence of a number of oculists of our city, Dr. J. L. Thompson conducting the examination, the patient was anesthetized and right eye bandaged up. On his partial return to consciousness, he said that he could see out of the left eye.

One year afterwards suit was instigated and damage was awarded to plaintiff for $2,000 on grounds of temporary blindness. As a witness in the suit, I testified that during my observation of the case objective symptoms indicated vision, while subjective symptoms indicated blindness. The temporary congestion of the nerve and early action of the case would indicate blindness from concussion. The concussion may have produced hysterical amblyopia. On the other hand, many symptoms of the case would indicate feigning blindness, a proposition advanced by the defendants.

It must be remembered that many remote conditions may result from concussion. These conditions, according to Walsham, occur more likely in those with predisposition to nervous diseases. Among the remote ocular conditions mentioned are optic neuritis and atrophy.

In conclusion I want to say that I believe it unfortunate that in damage suits the real physical condition of the patient is often obscured by both the attorneys for the plaintiff and the defendant. Only such evidence as may appeal to the jury is too often brought out.

To give a history of the case, with complete and accurate conclusions, too often subjects the physician to ridicule, detracting proportionately from the value of his testimony. It is for this reason that we are compelled for self-protection before a court of justice to volunteer no information and answer questions as briefly as possible.

DISCUSSION.

DR. H. M. STARKEY, Chicago, agreed that these cases of injury are most perplexing; not only the cases where damage is sought for injury, but the pension cases. Every case that comes to the Pension Bureau with loss of vision from injury or when applying for pension is viewed as a case of probable malingering, and it is the rule of the Pension Bureau where there is no physical condition to account for the blindness to reject the claim. As a rule, this is undoubtedly right, but still there are cases where that is not justice. There are cases in ordinary practice where there is no reason for the patient to want to appear blind, and where no physical reason can be found for the reduction or loss of vision. Dr. Starkey has had several such cases, in neither of which was there injury to the eyeball. The first patient was a man aged 30, who first came to him November 4, 1901, having suffered injury sixteen days previously from an explosion. The eyes escaped because of very thick glasses which he wore, being a myope of high degree. The lashes and other hair on the face were singed. Vision in one eye was 20/20 and in the other 20/50 at times, but he would see for a moment and then lose the sight suddenly. Vision improved in this case gradually to 20/30. The second case was that of a young man shot at from a distance of seven feet with a thirteen caliber ball. The bullet struck the border of the orbit, but did not penetrate the eyeball. It was extracted from near the ear and sight was permanently lost.

DR. J. L. THOMPSON, Indianapolis, stated that the patient mentioned in the paper was brought to him some weeks after Dr. Kyle had examined him. It was a very difficult case to examine, as he persisted in closing the eyes, and when the eyelids were lifted the eyes were forcibly turned downward. The pupils responded to light promptly, but that may take place when the patient is not pretending blindness. It is never wise to give an opinion hastily in such cases, because there is no certain test which is proof that a patient can see when he persists he is blind in both eyes, especially if he persists in shutting his eyes and looking down when his lids are raised. Dr. Thompson made several appointments with the patient's brother-in-law, who is a physician, and who was very honest about the matter. Five or six subsequent examinations were made at stated intervals, when drawings were taken of the fundus of each eye, with extreme difficulty. After some weeks the patient claimed that sight returned to one eye, but that he could see nothing with the other. This made the case a very easy one. A prism was placed before the seeing eye, the lids of both eyes were lifted by an assistant, when it was plainly evident that he could see with both eyes. Dr. Thompson did not inform the relatives of his discovery, but told the patient's brother-in-law that he must be examined under chloroform to determine as to the paralysis of the superior recti muscles, and of the upper lid muscles. All the physicians who had examined him previously were present when the chloroform was administered. As he was recovering objects were held above the eyes and he raised the eyeballs and lids with ease. The seeing eye was closed and he recognized the physicians with the blind eye and called them by name. The relatives were told that it was a case of hysteria, thinking thereby to let him down easily, supposing that would be the last of the case, but many months afterward the jury found that the hysteria was caused by the injury and awarded him several thousand dollars.

DR. H. V. WÜRDEMANN, Milwaukee, declared that, to be of use to the jury, the testimony of the medical expert, more particularly as to ocular injuries, should not be alone confined to the ocular lesion that may be present, and the effect of that lesion on the sight, not only the visual acuity and all the other visual factors, but also to their effect on the earning capacity of the individual. Of what does it avail the jury to tell them that a man has suffered from paralysis of the inferior rectus muscle, or that he has a hemianopsia? The testimony should, if possible, show that there is some actual lesion and should be described in plain language. In loss of vision from injuries attended by internal lesions which cause damage to the optic nerve, it is very difficult for the expert to demonstrate this to the jury. In the collection of the Supreme Court and Appellate Court judgments in the last ten years Dr. Würdemann has found but few cases in which the damage was not awarded except for loss of an eye or some great internal injury. They run from $150 for a black eye to $12,000 for loss of both eyes. Physicians should testify regarding the permanent results of the accident where possible. The medicolegal relation of these cases is not alone that which deals with the patient and his loss of earning ability, but also to the party causing the damage and to the physician or consultant who has seen the case previously. Dr. Würdemann has been in a considerable number of damage suits, and found that there is generally some blame attached to the physician who attended the case. This is especially true of the fourth of July accidents.

DR. EDWARD JACKSON, Denver, in reference to the detection of simulated blindness in both eyes, said that he believed that the plan suggested by Priestley Smith several years ago will be found always satisfactory. It is a prism test, not based on diplopia, but on the behavior of the eyes when both are open and a sufficient strong prism is placed before one. A person with binocular vision can not avoid the movement of one eye to escape diplopia when the prism of 8 or 10 degrees is placed before it with the base toward the temple. If there is vision in the two eyes there will be movement in the eye

before which the prism is placed. The patient can not overcome the impulse of attempting simulation. There may be a form of hysterical blindness in which the eye movements are under the subjection of some inhibitory influence, the same influence that causes the inhibition of the visual centers, in which this test would not work, but voluntary simulation can always be detected in this way.

DR. JOHN J. KYLE agreed with Dr. Würdemann that the jury would rather see the injury or result of injury than have the physician tell them about it. He was on a case a few weeks ago where a woman claimed damages for deafness, alleged to have been caused by a fall from a street car. From examination we had to deal with a case of labyrinthine disease. The attorneys for the woman wanted to prove that there was a perforation of the drum, which the woman did have. They wanted this fact brought out, instead of the fact that there was a labyrinthine trouble, knowing the jury could fully realize the danger of a perforated drum, and could form no conception of any trouble of the labyrinth, and by insisting on this point they secured damages.

IS BILATERAL OPERATION FOR CATARACT EVER JUSTIFIABLE?

AND IF NOT, HOW SOON AFTER THE OPERATION ON THE FIRST EYE IS IT SAFE TO EXTRACT THE SECOND CATARACT?*

A. W. CALHOUN, M.D., LL.D.
ATLANTA, GA.

An exhaustive review of text-books, medical journals, special periodicals and pamphlets revealed a total lack of literature bearing on this subject, and a letter of inquiry, sent to forty-one competent and experienced oculists in different sections of the country, showed the greatest diversity of opinion; about an equal number being on each side of the question.

This paper, therefore, is largely based on a personal and clinical experience of more that fifteen hundred cataract operations.

I can conceive of no circumstances that would justify me in making bilateral extraction of cataract. There are so many sources of infection and so many opportunities for it, that we can never be sure that an eye will not be infected during or after an operation, however careful we may have been in our work, or however perfect the patient's local, mental or physical condition may have been. The difficulty of cleansing the conjunctival sac is well-known. Indeed, the assertion has been made that the sac can not be made aseptic.

The intimate connection, through the lachrymal canal, between the nasal mucous membranes and the conjunctiva, renders the latter peculiarly susceptible to all the irritations and inflammations of the former, and every operator must recall to mind cases of infection traceable to this source. Regardless of the great advance made in the operation for cataract and its after-treatment, in spite of every precaution, suppuration occasionally occurs, and will continue to occur. A distinguished surgeon recently stated to me that he had seen suppuration occur thirty days after a seemingly successful extraction.

More frequently an iritis springs up, not necessarily fatal to the eye, but most distressing to the patient, and equally discouraging to the surgeon. Unexpectedly and without apparent cause, an anomaly in the healing process sometimes becomes a menace to the eye after extraction, adding another danger as to infection, and this would necessarily interfere with the normal process of healing in the fellow eye. I have had cases take not only days, but weeks, for the thorough healing of the corneal wound, there being all the while slight, gradually diminishing seeping of the aqueous through the wound. Some remote or hidden constitutional weakness was no doubt the cause of this. Such a case is a decided disturber of the surgeon's peace of mind, and would be suggestive of grave disaster in a case of double operation for cataract. Therefore the possibility of infection alone, should cause the too enthusiastic surgeon to pause and seriously consider, before proceeding to the bilateral extraction.

How absolutely helpless a patient must feel, with both eyes operated on at the same time; and if a severe form of iritis or other serious inflammation should set up in one or both eyes, there would certainly be great mental depression; and a cheerful and hopeful spirit is a mighty force in aiding recovery from any ailment.

A certain amount of experience, arising from the patient's peculiarities and from possible complications, is always gained by making the single operation, whether the results be good or bad, and the use of this knowledge would surely be a valuable guide, and increase the chance of success on the second eye. Not unfrequently it has happened to the most experienced and competent oculist that an eye has been lost after extraction through inflammation or other mishap—whereas later on, guided by his first experience, the other eye has been operated on by the same surgeon with perfect success. Now and then it happens that an eye lost through violent inflammation following a cataract operation, requires to be enucleated because of the sympathetic irritation, before we dare proceed with the operation on the other eye. It is easy to predict what would have happened to the fellow eye, had bilateral extraction been performed in such an instance. In this connection I would say that sympathetic ophthalmia is not a frequent, but a distinct element of danger, to be reckoned with in considering the double cataract operation.

Accidents and the patient's disturbed mental condition following cataract extraction, are contraindications to the bilateral operation. The unmanageable patient tossing from side to side of the bed, displacing his bandage, striking the eye with his hand, springing suddenly up in bed and by a strain disturbing the corneal wound, coughing, sneezing, etc., are actual occurrences in the hands of every experienced operator.

I once had a patient, who from a violent fit of coughing, sneezing and vomiting, had a profuse intraocular hemorrhage with complete emptying of the contents of the ball. If one could be happy under such circumstances, I was reasonably so, when I reflected that the other eye had not been touched. Loss of the vitreous, hemorrhage, panophthalmitis following accidents, glaucoma and possible sympathetic inflammation, with infection from many sources, constitute a chapter of possible accidents with such dreadful results, that I feel warranted in asserting that it would be unwise and unjustifiable to extract both cataracts at the same time.

Mental disturbances after cataract operations are of sufficient frequency to cause the surgeon some concern. Occasionally, after several days of confinement with both eyes bandaged, the patient becomes melancholy, has hallucinations and, in rare instances, becomes violent and ungovernable. This condition generally passes

* Read at the Fifty-fifth Annual Session of the American Medical Association, in the Section on Ophthalmology, and approved for publication by the Executive Committee: Drs. Frank Allport, John E. Weeks and R. L. Randolph.

rapidly away on uncovering the other eye, even though this is practically blind, and getting the patient into the fresh air. One such patient threw himself through a window, carrying sash and glass with him, while in this temporarily perturbed mental state. Another, who had been a sleep walker in his boyhood days, eluded his attendant and climbing through a second story window, leaped to the ground below. Again, I would say, there is some comfort in such cases, when we consider that only one eye has been operated on.

On one occasion Mr. Nettleship, a surgeon of vast experience, after having extracted one cataract under general anesthesia, turned to his class and remarked: "Now, gentlemen, what a temptation the opportunity presents to extract the other. But, gentlemen, never do so, until your patient has fully recovered from the first operation."

Looking at it from every point of view, to my mind, the extraction of cataract is one of the most important of all surgical operations, the whole future of the patient depending on its successful outcome. Answering from the standpoint of the patient, would one of us willingly submit to the bilateral extraction? I would myself unhesitatingly cry out "No!"

The second part of my subject is quickly answered. "How soon after the operation on the first eye is it safe to extract the second cataract?"

There are competent surgeons who maintain that it is not wise to operate on the second eye at all, if good results follow the first operation. There are good reasons for this conclusion. The frequent disturbance of muscular equilibrium, the confusion due to unequal vision in the two eyes, constitute reasonable grounds for advising against the second operation, provided the first has been a success.

My rule, however, is to operate on the second eye if the patient desires it, but I do not urge the operation. Circumstances should always guide us in selecting the time for the second operation, but except for some special reason, I prefer to wait six or eight weeks, when the first eye has recovered from all reaction, and the general health of the patient has been thoroughly restored. There can be no rule; each case must be its own law, but I am convinced of the fact that in ignoring the patient's desire for haste, we are but adding to his chances of successful results.

DISCUSSION.

DR. J. M. RAY, Louisville, considers that the majority of ophthalmic surgeons will agree almost entirely with Dr. Calhoun. Fortunately, as a rule, cataract matures in one eye before it does in the other, and so one cataract can be extracted before the other requires operation. Early in his career Dr. Ray became prejudiced against the double operation, and while he has seen it done once or twice he has not attempted the procedure. He sees no reason, however, why, in six or eight days after a perfectly smooth operation, the second eye should not be operated on, if the anterior chamber has perfectly reformed and if there is no reaction. The only class of cases to be excepted are those in which it is necessary to give a general anesthetic. In persons under 50 it is wise to urge the removal of cataract in the second eye, but at another time, while in persons over 70 Dr. Ray is inclined against operation on the second eye, because they can get all the vision necessary with one eye. In cases between these ages he generally leaves it to the patient to determine.

DR. J. L. THOMPSON, Indianapolis, said that before he knew so much about it he had almost phenomenal success in operating on both eyes at the same time. He operated on eleven persons with excellent results. One old gentleman of 87 lived to be 106 years and 3 months old and read until he died. But Dr. Thompson would not do the double operation now under any circumstances. Two of his patients went quite insane for a while, but there was a good result finally. Afterward Dr. Thompson changed to operating on the second eye eight days after the first, and now that is not correct. The patient may appear well and then in twelve or fourteen days some inflammation show itself, so that he does not now operate on the second eye until three months after the first operation, and, where one eye has been lost, he always does a preliminary iridectomy and then waits six weeks before extracting the lens. He thinks very much is to be gained by this preliminary iridectomy.

DR. HOWARD F. HANSELL, Philadelphia, said that during last winter he reported to the Ophthalmic Section of the College of Physicians the results of seven cases of bilateral operation. Since then he has operated on five more patients. His experience leads him to believe that the operation is not only justifiable but advisable in selected cases. The risk to vision is no greater, indeed less than that incurred by two single operations. His practice is to fully explain the situation to the patient and allow him to decide, since the procedure is one of choice rather than of necessity.

DR. LEWIS H. TAYLOR, Wilkesbarre, Pa., stated that he believes that we are never justified in operating on the second eye at the same time as the first. He mentioned one case in which the patient had been operated on in a neighboring city by a good surgeon, who performed a successful operation, and in spite of that fact the eye was lost. Iridocyclitis set up and the eyeball had to be enucleated. When the time came for operating on the second eye, knowing this history, Dr. Taylor felt a little afraid and advised the patient to go to New York, which he did, and was operated on there by one who has had the largest cataract experience of any of us, the second eye being lost in the same way as the first. Now, had that patient been operated on the first time in both eyes nothing, in his opinion or in that of his friends, would have exonerated the surgeon. Dr. Taylor always advises the patient to go home and remain some time until everything has quieted down before having the second operation.

DR. PETER A. CALLAN, New York, thinks that Dr. Calhoun is a little too radical. Dr. Callan has never hesitated to perform a double cataract extraction, and so far has escaped disaster. There is no question but that Dr. Callan's stand, in the main, is correct, but if all his ideas are followed out no eye would ever be operated on; that is to say, there are so many difficulties that one would rarely operate at all. Dr. Callan never hesitates, if the patient desires it, to operate on both eyes if the conditions are such as to justify it. He does not think that any fast and fixed rule can be made. As to the patient being satisfied with removal of the cataract from one eye, he thinks that is a mistake.

DR. C. F. CLARK, Columbus, Ohio, declared that he does not think that a physician is ever justified in being influenced by what the patient desires. The physician must decide that on his own responsibility on medical grounds, and if the second operation is desirable it should be done, but the responsibility should not be shifted to the patient.

DR. E. E. HOLT, Portland, Me., stated that he used to operate on both eyes, but for the last four or five years he has absolutely refused to do so. He never had a bad result, and often looks back on his experience now and wonders that he did not. He remembers going to a neighboring state and operating on two patients in this way in one day. One was 92 years old, and the patient wrote Dr. Holt letters for four years after the operation. But, while he has never had a bad result, nothing could induce him to do the double operation now.

DR. A. W. CALHOUN stated that his early experience was very much like that of Dr. Thompson. In the beginning, he operated on both eyes, but later he made up his mind never to do it again. He saw in the hands of a friend a case in which both eyes went wrong, and since then he has not done the double operation. Dr. Calhoun said that it is possible for suppuration of the wound to take place, or a slow form of

iritis may spring up within two weeks or more after the operation. To operate on the fellow eye after a week or ten days and then have an iritis occur in the first eye would be very bad. Another thing is that these patients are very liable to have conjunctival troubles make their appearance from one to three weeks after the operation. For these reasons Dr. Calhoun has come to the conclusion that it is best to wait six or eight weeks, or even longer.

A NOTE ON THE OPERATION OF GASTROENTEROSTOMY.

B. G. A. MOYNIHAN, M.S., F.R.C.S.
LEEDS, ENGLAND.

I am prompted by the report of a discussion on various gastric operations, which was published in THE JOURNAL of the American Medical Association, Sept. 17, 1904, to send a brief description of the operation of gastroenterostomy as I now practice it. The papers and the contributions to the discussion in THE JOURNAL are of the highest merit; and the distinction and the wide experience of all those who joined in the debate make the opinions therein expressed worthy of serious thought. The fact that there was not a little difference of opinion as to the mere mechanics of the operation of gastroenterostomy is my excuse for this paper.

I propose briefly to describe the method of gastroenterostomy by suture which I now adopt. It is modified in some slight degree from that which I mentioned in a paper I had the honor to read in May, 1903, before the American Surgical Association.

We may assume that any method of intestinal anastomosis must possess certain attributes which are of primary importance. These are:

1. Simplicity. The simplest surgery, provided the desired purpose is accomplished, is the safest surgery.

2. Rapidity. The quicker an anastomosis is completed the better.

3. Absence of exposure of viscera. In all abdominal operations there should be no unnecessary exposure nor handling of any part; while the manipulation of the area of anastomosis is going on, all other parts should lie within the abdomen and out of sight.

4. Perfect security of apposition immediately on the completion of the anastomosis and for a length of time sufficient for sound healing of the united viscera.

I believe that the method of gastroenterostomy by simple continuous suture with the aid of clamps fulfills all these essentials with perfect success.

TECHNIC OF OPERATION.

The operation of gastroenterostomy is performed in the following manner: The abdomen is opened about three-quarters of an inch to the right of the middle line, and the fibers of the rectus are split. After the peritoneum is opened, the great omentum and transverse colon are lifted out of the abdomen and turned upward over the epigastrium. The under surface of the transverse mesocolon is exposed, and the vascular arch, formed mainly by the middle colic artery, is seen. A bloodless spot is chosen, a small incision made in the mesocolon, and the finger passed into the lesser sac. The opening of the lesser sac is not always quite easy, and this is more particularly the case where there are adhesions between the transverse mesocolon and the stomach. It will be found of advantage to seize a small portion of the mesocolon in a clip, at a point near the spot selected for the opening. On drawing the clip away from the stomach the mesocolon is put on the stretch; a snip of the scissors by the side of the clip opens the lesser sac at once. The opening in the mesocolon is then gradually enlarged by stretching and tearing until the fingers can be passed through it. It is occasionally necessary to ligate a vessel. The left hand of the surgeon now makes the posterior surface of the stomach present at this opening, and with the right hand the stomach is grasped and pulled well through. A fold of the stomach, about three to four inches in length, is seized with a clamp (a modification of Doyen's clamp), whose blades are sheathed in rubber tubing. The clamp is applied in such a way that the portion of the stomach embraced by it extends from the greater curvature obliquely upward to the lesser curvature and toward the cardia. This is accomplished by applying the clamp obliquely, the tip of the blades pointing to the patient's right shoulder and the handle to the outer side of his left hip. It is important that the point on the greater curvature held by the clamp should be the lowest point. This is made certain before the stomach is turned over to reach its posterior surface, by observing that point which lies lowest in the abdomen. When the posterior surface is exposed, special care is taken that this lowest point is fixed in the end of the clamp.

The duodenojejunal angle is now sought, and readily found by sweeping the finger along the under surface of the root of the transverse mesocolon to the left of the spine. The jejunum is then brought to the surface, and a portion of it, about two to five inches from the angle, is fixed in a second pair of clamps. The two clamps now lie side by side on the abdominal wall, and the portions of stomach and jejunum to be anastomosed are well outside the abdomen, embraced by the clamps.

It is most important that precisely the right portion of the jejunum should be selected for the anastomosis. Almost all operators select a point far too low down. I decide on the point for the anastomosis by grasping the jejunum in my fingers and pulling it taut from the flexure. The jejunum while so held is laid against the posterior surface of the stomach and the fingers are moved along until they grasp the point which reaches exactly to the greater curvature of the stomach. The clamp is then applied so that this portion is the lowest piece (the piece that is most distal from the flexure) embraced by it. The result is that the jejunum from the duodenojejunal angle to the anastomosis forms a straight line, not a curve. The relation, therefore, is that which approximates most nearly to the normal. It is, I believe, the sagging of the jejunum, when a point eight to twelve inches or more from the flexure is used for the anastomosis, that is responsible for regurgitant vomiting.

The stomach, with the exception of the part embraced by the clamp, is returned to the abdomen through the upper part of the incision. The whole operation area is now covered with gauze wrung out of hot sterile salt solution, the clamps, with the stomach and jejunum which they embrace, alone being visible outside the abdomen. A continuous suture is then introduced uniting the serous and subserous coats of the stomach and jejunum. The stitch is commenced at the left end of the portions of gut enclosed in the clamp, and ends at the right. It begins on the stomach in that part which is nearest to the cardia and to the lesser curvature, and on the jejunum at that point which is nearest to the duodenojejunal flexure. The length of the sutured line should be at least two inches; its average length is two and one-half or three inches.

In front of this line an incision is now made into

the stomach and jejunum, the serous and muscular layers of each being carefully divided until the mucous membrane is reached. As the cut is made, the serous, muscular and submucous coats retract and the mucous layer pouts into the incision. The cut edges of these coats are loosened all round from the underlying mucosa. An ellipse of the mucous membrane is now excised from both stomach and jejunum, the portion removed being about one and three-quarters or two inches in length, and rather more than half an inch in breadth at the center. The gastric mucosa shows a marked tendency to retract; it is, therefore, seized with a pair of miniature (French) vulsella on each side. No vessels are ligated, as a rule. The cut surface of the bowel and stomach may occasionally ooze slightly; this can be checked at once by tightening the clamps one notch.

The inner suture is now introduced. It embraces all the coats of the stomach and jejunum, and the individual stitches are placed close together and drawn fairly tight, so as to constrict all vessels in the cut edges. This suture begins at the same point as the outer one, and is continued without interruption all round the incision to the starting point, where the ends are tied and cut short. It will be found that there is no need to interrupt the stitch at any point, for there is no tendency on the part of the sutured edges to pucker when the stitch is drawn tight. It is indeed a positive disadvantage to interrupt the suture anywhere, for by so doing the hemostasis is not so secure. The clamps are now removed from both the stomach and the jejunum, in order to see if any bleeding point is made manifest. Very rarely—about once in ten cases—a separate stitch at a bleeding point is necessary. The outer suture is now resumed and continued round to its starting point, being taken through the serous coat about one-sixth of an inch in front of the inner suture. This outer stitch is also continuous throughout; when completed, the ends are tied and cut short, as with the inner stitch. There are thus two suture lines surrounding the anastomotic opening—an inner hemostatic, which includes all the layers of the gut; and an outer approximating, which takes up only the serous and subserous coats.

For both stitches I use thin Pagenstecher (celluloid) thread. The needle used is of a special pattern, being rather more than half a circle and having a slot-eye for easy threading. In introducing the stitches it will be found a great advantage to draw lightly on the thread between the needle and the last stitch. A little ridge is thus raised up both in the stomach and in the intestine, and into these ridges the needle passes quite readily. There is, then, no need to dip down, as it were, to pick up the gut on the point of the needle.

The gut is lightly wiped over with a swab, wet in sterile salt solution, and the stomach and transverse colon and omentum which had been replaced within the abdomen are now withdrawn.

With the left hand holding these and the right holding the jejunum, the slit made in the mesocolon is seen to embrace the line of suture snugly. Two or three interrupted sutures are now introduced which unite the margins of the slit in the mesocolon to the jejunum close to the suture line. As a rule, I use three stitches, one on each side, and one at the lowest point of the anastomosis. The result of this is that the line of suture in the anastomosis is not seen from below. It is everywhere closely embraced by the edges of the rent in the mesocolon, and it is thereby considerably reinforced. Leakage from the suture line or yielding of it is virtually impossible; it has never occurred in any of my operations. If it were possible, it would be rendered very much less likely by this little modification.

There are one or two fears entertained with regard to the operation of gastroenterostomy which may be dissipated. The first of these refers to regurgitant vomiting. Regurgitant vomiting is a thing of the past. In over 100 consecutive cases I have never seen any vomiting except that due to the anesthetic, and very rarely that. There can be no question that patients after gastroenterostomy vomit less than patients after any other abdominal operation. This may be due to the very slight exposure and handling of parts or to the fact that a new and free road from the stomach is now open. In my early cases I noticed regurgitant vomiting of a severe type in three patients; on two of these I operated a second time, performing entero-anastomosis.

Regurgitant vomiting is prevented in the operation I describe by attention to three points:

(*a*) The anastomosis is made very high in the jejunum; there is no loop.

(*b*) The anastomosis is made at the lowest part of the stomach.

(*c*) The patient is propped up in bed as soon as he begins to come round from the anesthetic.

The second of the fears is that which has reference to the subsequent narrowing of the new orifice. This fear is ill founded. When narrowing and closure of the new opening occur I believe that they are due to imperfection in the method which has been used. By the operation as now described, a large opening, not a slit, is made between the two viscera. The free removal of the mucosa (which I was the first to practice and for thought of which I am indebted to the Murphy button, which "stamps out" a piece of the stomach wall), lessens the likelihood of closure. This alone, however, could not prevent it. In addition to this removal of mucosa, it is necessary to make the opening of large size; of a size, too, that is not always the same, but is proportioned to the size of the stomach. When a greatly dilated stomach is operated on and a free outlet made from it, it is obvious that, under the new conditions, the stomach will speedily lessen in size. As it does so, the new orifice lessens also; moreover, some cicatricial contraction in the orifice occurs. The result will be that the anastomosis becomes less than it was when the surgeon left it. It is absolutely necessary, therefore, that when a very large stomach is operated on the size of the orifice should be large.

By the method I adopt, an opening of any size can be made, and on one occasion, when dealing with an amazingly dilated organ, I made the anastomosis four inches in length. Dr. W. J. Mayo has often expressed the opinion that contraction in the new anastomotic opening is due to a renewed patency of the pylorus. Anyone who has seen Dr. Mayo at work, who knows his vast experience, and who realizes the wonderful accuracy of his judgment, will not be eager to dissent from him unless strongly convinced of the accuracy of his own observations. In the opinion which I have just quoted I can not acquiesce. I have seen an anastomosis which I have made (on reopening the abdomen for another purpose) after two years, and though the pylorus was, and always had been patent, there was no appreciable shrinkage in the size of the opening. In two recent cases I have repeated this experience. Marked shrinkage in the size of the anastomotic opening is due, therefore, I believe, not to any condition of closure or

patency of the pylorus, but to errors in the making of the opening. The new orifice should always be large, and when occasion demands it, should be as much as four inches in length. For this reason a transverse incision in the jejunum, as made by Mikulicz, is undesirable. The opening when so made can not be longer than the diameter of the jejunum, and this size even in an ordinary case is not enough.

Such additions to operations as enteroanastomosis closure of the pylorus, etc., are entirely unnecessary. If the operation is properly performed there is no loop; the two branches which are to be joined in an entero-enterostomy do not, therefore, exist.

The average time needed for the performance of the operation, from beginning to end, is between twenty-five and thirty minutes. I have done the operation in seventeen minutes, in twenty-one minutes, and perhaps a score of times in less than twenty-five minutes. But these times are exceptional, and were due to the need of haste, owing to the poor condition of the patient. The usual operation lasts twenty-five to thirty minutes.

Finally, I venture to urge that those surgeons who are undertaking operations on the stomach in large numbers will give this method of mine a reasonable trial. It is the simplest of all methods, rarely offers any difficulty, and has been attended by most satisfactory results. I can not think that elastic ligatures and twines or any mechanical appliances possess equal safety or simplicity. I have performed gastroenterostomy in 162 cases of ulcer of the stomach and duodenum (excluding hour-glass stomach, for which a double operation is often necessary). In 20 cases the operation was done for acute hemorrhage (with excision of ulcer in 2) with two deaths. In 142 cases of chronic disease there were two deaths.

The two deaths in the acute hemorrhagic cases were due to great collapse at the time of operation and were the result of an unsuccessful attempt to save lives doomed, without doubt, unless operation could save them. The deaths in the chronic cases were due, the first to a hernia of all the small intestine through the opening in the mesocolon (this is prevented now by the stitching of the mesocolon to the jejunum); and the second to failure of the kidneys.

Clinical Report.

A LAYMAN'S TREATMENT OF A URETHRAL STRICTURE AND RETENTION OF URINE.

C. J. RINGNELL, M.D.
Surgeon to the Swedish Hospital.
MINNEAPOLIS.

Many curious incidents occur in the practice of medicine and surgery, but the one which I am about to relate is certainly unique.

Condition on Admission to Hospital.—One evening, some time ago, I was called to the hospital to attend an old man who had been brought in from the country suffering from some trouble for which prompt relief was necessary. On approaching the bed I noticed the odor of gangrene and decomposed urine; the patient had an anxious look about him; he was excited at intervals and at times delirious; tongue was coated and dry; there were sordes on the teeth, and the lips were parched. The respiration was labored; pulse small, wiry and rapid; temperature 100 F. The trouble was evidently of a grave nature.

History.—From the young man who had brought the patient to the hospital I gleaned the following history of the case: The patient was a widower, aged 64, and lived a hermit life by one of the beautiful lakes not far from this city, cultivating a few acres of land and amusing himself with fishing and hunting whenever a change was desired. His health had always been good, with the exception of an old urethral stricture of which only his most intimate friends had any knowledge. (I mention this because no one but the young man who told me these facts had any idea of the condition the old gentleman was in just before being brought to the hospital.) The old fellow's neighbors were few and far between and so at times he would get lonesome and wander away to the city; there his old habit of indulging too freely in strong drink would return, and, as alcoholic drinks and old strictures are generally incompatible, trouble of an annoying nature invariably ensued. On such occasions a physician was generally consulted, and a catheter brought the desired relief. This operation had been repeated so often that the sufferer had acquired some knowledge of its execution, but at times the technic would be faulty. Rubber catheters, straws, and various other objects of a similar nature had been employed in the execution of this delicate operation. Before leaving the city after the last visit, a good-sized flask of whisky had been procured. Feeling tired and weary on his arrival home, after the troublesome journey and "good time," the color of the flask soon began to change. Beer and various mixed drinks are fairly efficient diuretics, and as overstimulation at times produces a certain amount of anesthesia, the bladder soon became overdistended and the muscles, instead of relaxing, contracted. The old stricture also refused to relax, and right here the trouble, which proved so stubborn and refused to yield, although the most extraordinary treatment was resorted to, commenced, for which my services were sought. The catheter could not be found, so various sizes of straws were collected and manipulated in the usual manner; but the old stricture was firm and refused to let Nature's instruments pass. It was now far into the night, and no physician could be reached The kidneys continued their work, and the bladder was filling up rapidly. Relief must come soon!

The Patient's Treatment.—There was no one to consult with, and a new line of treatment, which finally proved disastrous, was instituted. Some years ago, while drilling and blasting ledges of rock in a stone-quarry, the power of gunpowder had been observed. Why should it not work here. The ammunition box was secured and a few cartridges emptied of their contents. The urethra, from that incorrigible stricture to the meatus, was carefully filled with powder; a lighted match was applied, and an explosion occurred, shattering the urethra and surrounding structures completely. But relief from the original trouble was only partial. The mutilation produced by the explosion brought on hemorrhage, extravasation of urine, septic inflammation and, finally, gangrene.

Hospital Treatment and Results.—Three days after this heroic treatment he was found and sent to the hospital. The gangrene had already invaded the scrotum and abdominal parietes, and treatment would, in all probability, be of no avail. Under ether anesthesia, the gangrenous parts were removed, the bladder drained through the perineum and antiseptic dressings applied. The patient rallied after the operation, but the septic intoxication was too pronounced, and death ensued the following day.

Country Practice.—In 1871 Germany was a nation of 39,000,000 inhabitants, of whom 60 per cent. were engaged in the agricultural pursuits. In 1900 it had increased to an empire of 58,000,000 inhabitants, of whom 35 per cent. were engaged in agriculture and 65 per cent.—nearly two-thirds—in industry and trade. The above statistics suggest the inquiry whether a similar change has taken place in the United States. If so, this has considerable bearing on the proportion of country practitioners then and now.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

103 DEARBORN AVENUE . . . . CHICAGO, ILL.

Cable Address . . . "Medic, Chicago"

Subscription price . . . . . Five dollars per annum in advance

SATURDAY, DECEMBER 24, 1904.

GOVERNMENT CONTROL OF VACCINE VIRUS.

It is seldom that the good effects of legislation are so quickly seen as in the results following the act of Congress, approved July 1, 1902, regulating interstate traffic in vaccine virus, antitoxin and analogous products.

In accordance with the provisions of this act and the regulations framed thereunder, the Surgeon General of the Public Health and Marine-Hospital Service is required to cause an inspection of the establishments manufacturing vaccine virus for interstate sale, and the director of the hygienic laboratory, of that service, is required to buy vaccine virus on the open market from time to time, and examine it to determine the presence of impurities or lack of potency. The laboratory examinations are made in accordance with the usual bacteriologic methods, and primary vaccinations in children are made to determine the potency of the virus and to study the character of the "takes."

We learn that it has been over a year since any great number of bacteria have been discovered in a vaccine point or capillary tube, and the bacteria that are present are of the harmless variety. The frequent inspections which, by the law, are required every year of the vaccine establishments by officers of the national health service and the almost constant laboratory examinations of the vaccine virus sold by druggists, have enabled the Federal Government to obtain a firm grasp on the vaccine situation of the country. The notable improvement in the quality of the vaccine virus is not only manifest in the lessened impurities, as shown by laboratory tests, but fewer infected "takes" are reported.

These results are especially gratifying, and recall Rosenau's[1] work in 1902-03, before the passage of the act above mentioned, at which time the many sore arms were readily accounted for by the serious contaminations found in vaccine virus produced by irresponsible manufacturers. Rosenau showed at that time that "green" virus was sold on the open market, and that manufacturers did not give sufficient attention necessary to the production of a clean product. Within a few months following the enactment of the law, four firms went out of business, not having been able to comply with the modern requirements.

There is still one phase of the vaccine problem peculiar to the United States that needs the attention of the government. Greater care must be exercised by manufacturers in shipping their product from place to place. We know that milk, fruit, meat and all perishable products are shipped in refrigerator cars or under special conditions, and it is not too much to ask that similar precautions be taken in the transportation of vaccine virus—equally perishable and equally important. Much of the vaccine virus found on the market is impotent, because it has been sterilized in the baggage or mail car by too close proximity to the steam coils. Vaccine virus is particularly susceptible to a temperature above the body heat, and must be kept in a cool, dark place in order to retain efficiency. We understand that the Surgeon General of the Public Health and Marine-Hospital Service is giving attention to this phase of the question.

1. The Bacteriologic Impurities of Vaccine Virus; an Experimental Study, M. J. Rosenau, Bulletin No. 12, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service. The Antiseptic and Germicidal Properties of Glycerin. M. J. Rosenau, Bulletin No. 16, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service.

DUPLICATE TWINS AND DOUBLE MONSTERS.

From the lay point of view, the humorous complications which might and do occur in connection with duplicate individuals, seem to have found most favor, and since the time of Shakespeare and his "Comedy of Errors,'" we not infrequently find the twin both in literature and the drama. Even in medical works the similarities of twins rather than their dissimilarities have been noted and commented on.

Recently, H. H. Wilder[1] has completed an elaborate study of twins, in which he not only discusses their method of origin, but also considers their similarities and dissimilarities from a new point of view, namely, the resemblances and differences of configuration in the skin patterns of the palms and soles. As Wilder shows, there are two types of twins—those in which the pair are invariably of the same sex, and are characterized, especially as children, by their marked resemblance to one another, and those in which the pair may or may not be of the same sex, and are not more alike than children born of the same parents at separate births. The first class of twins Wilder calls duplicate twins, and the second class fraternal twins. From his investigations into multiple births, in which more than two children are born at a time, Wilder concludes that the same rule in a modified form holds good here. In the case of triplets, for example, two of them may be duplicate twins, and the third different, i. e., fraternal, or all three may be fraternal.

Wilder's studies of the finger and foot prints in duplicate and fraternal twins bring out many points of interest. He finds that in duplicate twins, with some minor exceptions, the finger and foot prints are the same in the two individuals down to, but not in-

1. American Journal of Anatomy, vol. III, No. 4, 1904. See a letter from Wilder in this issue of THE JOURNAL, page 1982.

cluding, the minutiæ. He thinks that this difference in the minutiæ is due to the fact that influences acting after birth may modify them, while the main patterns already exist at birth. In fraternal twins the foot and finger prints are no more alike than is usually the case with different members of the same family. Curiously enough, in the duplicate twins the index-finger pattern in one of the twins may be exactly reversed in position to that of the other twin; that is to say, the pattern in one twin may face toward the radial side, and in the other toward the ulnar side of the hand.

Wilder's explanation of the two forms of twins leads us into the field of experimental embryology. He thinks that in the case of the fraternal twins we are dealing with two distinct ova which became fertilized at the same time, and this view is borne out by the fact that twins of this sort usually have separate placentæ. In the case of duplicate twins, we are dealing with a single egg fertilized by a single spermatozoön, which, after fertilization, begins to divide in the usual manner. After the first cleavage of the egg, the two resulting blastomeres become separated, and each develops into a separate child. That this actually does occur in some of the lower forms of animal life has been abundantly demonstrated by experimental methods, and that it is probably what occurs in duplicate twins is shown by the fact that such twins have each a separate chorion and placenta. In the case of duplicate monsters, which are very closely allied to duplicate twins, we have a partial instead of a complete separation of the two original blastomeres. The fused portions of the two blastomeres give rise to a single individual, while each separated portion gives rise to a separate individual. We can easily see, following this explanation, how in some instances double monsters are fused at the head, in other instances at the feet, and in other instances at the midportions of the body, this depending on the portions of the original blastomeres which were separated. Besides bringing out these many interesting facts, the study shows how few cases of twins there are which are adequately studied, and suggests a fruitful field for the general practitioner, who alone is often able to follow twins over the long period of years which must elapse to make such studies of value.

THE MODE OF ACTION OF ANTISTREPTOCOCCUS SERUM.

In 1895 Denys and Leclef immunized rabbits by injecting them with small but gradually increased doses of a virulent streptococcus, and succeeded in getting animals that were resistant to about one thousand times the minimum fatal dose for their organism. At about the same time, Marmorek, Roger and also Denys and Leclef immunized horses and mules against these organisms, and each of them obtained an antiserum that had some protective properties against the particular strain of streptococcus used in preparing the serum. Since that time many other experimenters have prepared antistreptococcus sera which protected laboratory animals against many times the minimum fatal dose of the streptococcus used in preparing the serum, but it is still an open question whether or not any of these sera protects against a streptococcus coming from a different source and rendered virulent for an animal of a different species. Some investigators, as Van de Velde, Tavel and others, believe that antistreptococcus serum for clinical purposes must be prepared, not by injecting the animal with one strain of streptococcus, but with a mixture of cultures of many different strains of this organism. They hold also that the streptococci must not be passed through animals before they are used in immunization, but must be used as they come from the human body. This entire question is, however, still in a very unsettled state and needs to be investigated further.

The exact mode of action of antistreptococcus serum has also been made the subject of careful studies by Denys and Leclef, Bordet, Neufeld and Rimpau, Besredka and others. We know that antidiphtheria serum and antitetanus serum contain a true antitoxin for the soluble toxins of these organisms, and the neutralization of the toxin by the antitoxin may be likened to the neutralization of an acid by a base. Careful investigations have shown that there is another class of antisera which do not contain antitoxin, but are destructive of the bacteria. These are the so-called bacteriolytic sera, of which antidysentery serum is a good example. It has been shown conclusively that antistreptococcus serum is not a bacteriolytic serum, because streptococci multiply rapidly in it, and it is not likely that this serum is of the nature of a true antitoxin, because nobody has as yet succeeded in preparing a strong soluble toxin of streptococci. Some samples of antistreptococcus serum do, however, possess protective properties against these organisms, and they seem, therefore, to represent a third class of antisera. Bordet was able to show that there is more active phagocytosis of streptococci in the peritoneal cavity of a rabbit that had been injected with a dose of antistreptococcus serum than in the peritoneal cavity of a normal rabbit.

In the normal rabbit hardly any of the virulent cocci were taken up by the phagocytes, and the rabbit soon died of streptococcus infection, while in the treated rabbit all of the cocci were taken up, and if the dose was not excessively large the animal recovered. In test-tube experiments the addition of antiserum to a mixture of leucocytes and virulent cocci aids phagocytosis, but there is no lysis of cocci by a mixture of immune serum and normal serum. The filtered broth cultures of a virulent streptococcus do not prevent phagocytosis of the non-virulent streptococci. Bordet concluded from his experiments that the antistreptococcus serum stimulates the phagocytes so that they will take

up the virulent cocci. This conclusion was also reached by Besredka in a very recent paper on antistreptococcus serum. These experimenters do not believe that antistreptococcus serum is of the nature of an antitoxin, but that it is a stimulant to the phagocytes.

Whether or not this view is correct can hardly be stated positively at present, but the experiments of Denys and Leclef,[1] and very recently those of Neufeld and Rimpau,[2] make it seem very probable that another explanation is the correct one. It has been shown by these investigators that leucocytes from an immune rabbit, and also those from a normal rabbit, suspended in immune serum, take up and destroy many virulent streptococci, while neither the leucocytes from an immune rabbit nor those from a normal rabbit in normal serum will take up the virulent cocci, unless immune serum is added. If now the leucocytes are treated for twenty minutes to half an hour with immune serum, centrifugated out and washed in salt solution and then suspended in normal serum, it is found that they do not take up virulent cocci which are added to the suspension. If, however, the virulent cocci are treated with immune serum, then washed in salt solution and added to a suspension of leucocytes in normal serum, they are readily taken up by the leucocytes. These experiments show that the streptococcus immune serum does not bring about a change in the leucocytes, by virtue of which they are enabled to take up virulent streptococci, but that it has a direct effect on the cocci, changing them in some way so that the leucocytes will ingest them. It is not probable, therefore, that there is a stimulation of phagocytes, but the immune serum seems to neutralize something (toxin?) in the bacterial cells which protected them against ingestion by the leucocytes. Heating the antistreptococcus serum to 59 C. for one-half hour does not deprive it of its power to change the virulent cocci so that they will be taken up by the leucocytes, and hence Neufeld and Rimpau conclude that the serum owes this property to the presence of an amboceptor, or a substance having the nature of an amboceptor. This conclusion can, however, not be accepted without further proof.

In general, this view seems to be the correct explanation of the mode of action of antistreptococcus serum, and it becomes even more plausible when we recall the experiments of Wright and Douglas[3] on the rôle of the body fluids in phagocytosis of less virulent bacteria. They have shown that washed human leucocytes do not ingest any bacteria unless the latter have been treated for some time with normal serum, or are added to leucocytes suspended in serum. We see, therefore, that phagocytosis of non-virulent bacteria by human leucocytes and phagocytosis of virulent streptococci by rabbit leucocytes, aided by immune serum, are two closely analogous phenomena.

1. La Cellule, 1895, xi, 177.
2. Deutsch. med. Wochens., 1904, xxx, 1458.
3. See THE JOURNAL A. M. A., 1904, xlii, p. 1689.

ENURESIS IN CHILDHOOD.

Involuntary discharge of the contents of the urinary bladder is physiologic in infants, ceasing at varying times in different individuals. Control of the sphincter of the bladder by day is acquired earlier than such control by night. Intercurrent disease may delay the manifestation of continence. When the lack of control persists beyond the third year it may be considered abnormal, and it is then designated enuresis. In the absence of disease of the nervous system the disorder has been thought, on the one hand, to be merely a functional disturbance, or, on the other hand, to be a symptom or a sequel of underlying or antecedent disease. The distinction between functional and organic disease is, however, only one of degree, and while tangible evidence demonstrative of a pathologic basis is not obtainable in every instance of enuresis, it must be inferred that some morbid process or abnormal condition is present, often, perhaps, undiscoverable by present means of investigation. Testimony to this effect is given by Dr. J. C. Rey,[1] in a recent communication, in which he details the results of a careful study of the state of the bladder and of the urine in 52 cases of enuresis in children during a period of five years. It was found that in the overwhelming majority of cases in which disease of the central nervous system, idiocy, infantilism and athyreosis were not etiologic factors, the cause of the disorder could be traced to disease of the bladder or adjacent organs.

In order that enuresis, which may be considered physiologic in the first ten months of life, shall persist beyond this time and even after the third year, there is necessary, in the presence of an otherwise normal nervous system, and in addition to the direct or indirect irritation of the bladder, a certain degree of enfeeblement or deficiency of the will. This latter, likewise physiologic in infancy, may persist in consequence of habituation to the enuresis from vesical disturbance due to disease of the bladder or to some peculiarity of the urine. Such impairment of the will may persist longer than the affection of the bladder. The sudden improvement that follows application of the faradic current, epidural injections and the like, under such circumstances is readily explained on neurotic grounds; but, when the vesical irritation persists, all educational and antihysteric measures will prove futile. The cases in which enuresis appears to be the only symptom of hysteria in children are likewise readily explained in a similar manner, unless the disorder can be attributed to the existence of a cystitis or urethritis or their consequences, namely, residual hyperesthesia of the bladder and the neck of the bladder.

In order to clear up the etiology of enuresis, it is necessary, in all cases that continue under observation for some time, to make frequent chemical and bacteriologic examinations of the urine, and to take note, more

1. Berl. klin. Woch., Aug. 29, p. 922; THE JOURNAL, p. 1014.

than has been the practice in the past, of the frequent occurrence of catarrh of the bladder in infants, and, when possible, especially in girls and older boys, also to make endoscopic examination of the bladder.

NON-FATAL RUPTURE OF AORTIC ANEURISM.

Although rupture of an aneurism of the aorta is generally fatal, the resulting hemorrhage has, in rare instances, ceased, and the mortal issue has for the time been deferred. In one instance on record, life was prolonged for as long as five years and in another for two years. Under such circumstances the cessation of the bleeding must be attributed to a plugging of the opening by a portion of the clot contained in the aneurismal sac. A case of the character under consideration is reported by Dr. Charles H. Melland.[1] A laborer, 56 years old, was admitted to the hospital with a history of having coughed up a large amount of blood. He was apparently moribund, but as the bleeding had ceased, two pints of normal saline solution were introduced into the median basilic vein. The patient rallied rapidly, and great improvement took place in his general condition. This persisted for three weeks, when death resulted from another hemorrhage. Necropsy disclosed a sacculated aneurism as large as a hen's egg, arising from the convexity of the arch of the aorta immediately beyond the left carotid artery. The sac was almost filled with firm, laminated clot, and posteriorly it extended between the trachea and the esophagus. The trachea wall had been thinned and the blood had escaped through a small slit.

THE TREATMENT OF HEMOPHILIA.

Nothing is known of the essential nature of hemophilia, and the disorder has proved most rebellious to treatment. The affection is believed to be due to disease of the blood or of the vessels, or of both. It occurs almost exclusively in males, although it may be, and usually is, transmitted through females. In view of this fact Dr. Lachlan Grant[2] argues that the blood or the tissues of the female must be the seat of some restraining influence which, he suggests, may emanate from the reproductive center, perhaps an internal secretion; for example, that of the ovaries. In accordance with this reasoning, he proposes the internal administration of extract of ovaries, mammary gland or other tissue peculiar to the female as a therapeutic procedure for the control of the bleeding in cases of hemophilia, and he relates a case in which he was able to put the suggestion to practical test. A boy, eight years old, with a hemophiliac heredity, bled freely and obstinately from a wound on the sole of the foot inflicted by a piece of glass, despite active treatment, including pressure and local applications of adrenalin hydrochlorid. Finally, after the patient had become anemic and the prognosis grave, extract of ovarian gland was given in doses of two and a half grains thrice daily, with the result that the bleeding soon ceased, while improvement in both the general and the local condition also ensued. Of course, it is not to be concluded from the foregoing report either that the reasoning put forth is correct, or that the result attained was really due to the treatment instituted. Nevertheless, the experience gained in this case is at least sufficient justification for the further use of ovarian extract in cases presenting the hemorrhagic diathesis.

1. Lancet, Nov. 19, 1904, p. 1414.
2. Lancet, Nov. 5, 1904, p. 1279.

PHYSICIANS AND RECIPROCITY.

The physician, because of the nature of the work required of him, may usually be expected to have his wits about him. We have read of the physician who, receiving a large plumber's bill and being scandalized by some of the time-consuming methods of that tradesman, paid the bill and bided his time. Being the family physician of the plumber, he was called one day and went without medicine case or instruments. On finding what was the matter, he went home for his case, and included in his bill a liberal charge for this procedure. The plumber remonstrated, but when it was explained to him that the physician did not know what tools he wanted until he saw the patient, the plumber grasped the situation and paid the bill. From across the water comes the news of another bright physician, one able to appreciate the possibilities of reciprocity when the circumstances made it necessary. A physician received a box of cigars by mail with a bill therefor and with a letter, stating that, although the physician had not ordered the cigars, yet the maker took the liberty of sending them, convinced that he would find them excellent. The cigars were good and the physician smoked them. When the box was empty he sent the maker several prescriptions, accompanied by a bill for the same, which amounted to the same as the bill for the cigars, and accompanied by a letter stating that, although the cigarmaker had not asked for medical advice from him, yet he took the liberty of sending him some prescriptions, convinced that he would find them excellent.

ELECTRIC POSSIBILITIES.

The future uses of electricity, as described by Nikola Tesla, are interesting to contemplate from the standpoint of fiction, whether one is prepared to accept the statements as plausible or not. In a recent article in the *Electrical World and Engineer*, Tesla announces that "many thousands of simultaneous telegraph and telephonic messages, through one single conducting channel, natural or artificial, and without serious mutual interference, are certainly practicable, while millions are possible." We should certainly welcome this wholesale elimination of telegraph and telephone wires which form such networks in our great cities and which are often a menace to life. This elimination would certainly be a step in advance from the standpoint of municipal art. Tesla further announces the possibility of collecting electric energy all over the globe in small amounts, and by it running clocks and all the common machinery. Thus the physician will only have to tap the atmosphere, so to speak, by having the proper sort of a gatherer of electricity, to which he may attach his

centrifuge, his bone drill, etc. But this is not enough. Tesla declares that "this planet, with all its appalling immensity, is to electric currents virtually no more than a small metal ball," and when "the first plant is inaugurated it will be shown that a telegraphic message, almost as secret and non-interferable as a thought, can be transmitted to any terrestrial distance." Finally, "the sound of the human voice, with all its intonations and inflections, can be faithfully and instantly produced at any other point of the globe, or the energy of waterfall made available for supplying light, heat or motive power, anywhere—on sea or land." "I am hopeful," says he, "that these great realizations are not far off, and I know that when this work is completed they will follow with mathematical certitude." For a vision from a visionary mind, this is almost incomparable.

THE INFLUENCE OF DISEASE OF ONE KIDNEY ON THE MOLECULAR CONCENTRATION OF THE BLOOD.

Some doubt yet exists as to the value of cryoscopy from the diagnostic and prognostic points of view, and as to the validity of conclusions to be drawn from studies of the molecular concentration of the blood, as determined from the freezing point of the urine, and it is to be feared that the hopes aroused by the earlier investigations on this subject will not be realized. The freezing point may be reduced, among other causes, by disorders that cause interference with the circulation, such as uncompensated cardiac lesions and disease of the blood-vessels and the liver; also as a result of the presence of large tumors, especially in the abdomen, interfering with the circulation and giving rise to symptoms of stasis and exerting pressure on the ureters. It has been thought that if in the presence of disease of the uropoietic system the molecular concentration of the blood is increased there must be disease of both kidneys, while if the freezing point of the blood remains normal the urinary passages or at most only one kidney is affected. Evidence is, however, not wanting that disease of both kidneys may be present without increase in the molecular concentration, while disease of one kidney may be attended with such increase. A demonstrative case belonging to the latter category has recently been placed on record by Drs. A. Loeb and C. Adrian.[1] A man, fifty years old, presented symptoms of malignant neoplasm of the left kidney, with increase in the molecular concentration of the urine from both kidneys and reduction in the freezing point of the blood. On account of this fact, in conjunction with the debilitated state of the patient, operation was decided to be inadvisable and death took place in the course of six months. On postmortem examination the left kidney was found to be the seat of carcinoma, while the right was quite healthy. In explanation of the cryoscopic findings in the foregoing case it is suggested that the rapid growth of the neoplasm in the left kidney caused the entire burden of the secretion of urine to fall within a relatively short time on the right kidney, whose functions were interfered with by the existence of the carcinomatous cachexia.

1. Berliner klin. Wochenschrift, Sept. 26, 1904, p. 1021.

NURSING AND PATRIOTISM.

In the early part of 1904 the War Department sent out—through the various training schools for nurses and through other available means—circulars requesting the registration of such trained nurses as were willing to hold themselves in readiness for government service in case of war. Of these circulars, according to the leading organ of the nursing profession, only six were returned to the War Department up to a recent date; that is to say, only six trained nurses in this country were willing, or took the trouble to announce themselves as willing, to serve their country in case of its need. The requirements of the registration were not onerous. All that was asked was a statement that the nurse would hold herself in readiness and would make periodical reports as to residence and condition of health. In case the services were needed there was the assurance of continuous and fair pay and support, with duties confined to base hospitals, and ample opportunity for interesting and profitable experience. As female nurses are not wanted at the front, the element of danger is practically eliminated from this kind of military service, except, of course, the danger of contagious or epidemic disease, and from possible change of climate. As the *American Journal of Nursing* says, there is no doubt that in case of war the government would be overwhelmed with applications of volunteer nurses, good, bad and indifferent. The enthusiasm of the moment would be sufficient to insure this. It would be a very different thing, however, if there were a selected list of well-accredited, competent persons to call on in emergency. The saving of expense, disappointment, and even of possible scandal, would be almost incalculable. It is to avoid the possibility of embarrassment by applications from discreditable persons that this waiting list was proposed, and it is, moreover, in the interest of the nurses themselves that they should not be misrepresented by such persons in the case of the country's need. It is a pity that the trained nurses of the country have not made a better showing of their patriotism and philanthropy than seems to have been the case.

THE PURE-FOOD BILL.

The pure-food bill now before Congress is one of paramount interest from a medical view-point, as evidenced by the fact that nearly 3,000 individual physicians and hundreds of medical societies have written to Senator Heyburn and to their various senators asking for the enactment of this piece of legislation. We trust that they may be rewarded for doing their duty by seeing the bill become a law. So far, there has been no direct opposition to the bill, as its virtues are fully recognized. Several members of the Senate, however, have claimed that certain terms and clauses are vague and indefinite, and are calculated to give the courts trouble in placing the responsibility where adulterated or misbranded goods are sold. In the interests of the drug trade and of the proprietary medicine concerns, it is desired to restrict the term "drug" to substances and preparations described in the United States Pharmacopeia, but as Senator McCumber[1] of North Dakota

1. Congressional Record, Dec. 13, 1904, pp. 198, 199.

says: "The bill does not prevent a man from buying what he desires to eat, or what he desires for a drug; it simply declares that he shall be protected in buying what he does want, either for food or in the drug line." No honest dealer or manufacturer should object to a bill of that kind; nor should he object to putting a label on his products, stating plainly their composition. Senator McCumber[1] argues: "The government passes stringent laws with reference to counterfeiting. Those laws provide that if I pass a counterfeit coin the penalty may be ten years' imprisonment. If the government, therefore, compels me to use coins of absolute value and integrity, then, I submit, it is incumbent on the government to protect me in securing goods of absolute integrity, so far as in its power. . . . It seems to me that if it is an injury to the country to flood it with spurious coin, used in the purchase of good goods, it is equally an injury to the country to flood it with spurious goods to be traded for good coin." Because of the alleged lack of clearness in some respects, it is said that the bill is not likely to become a law at present. This is much to be regretted. The adulteration of foods and drugs in this country has become an evil of great magnitude, and one with which the individual states seem to be unable fully to cope without the aid of a Federal law. If the objections to the bill on the ground of indefinite phraseology are founded on fact, no time should be lost in rewriting those portions. If, on the other hand, these objections are instigated by some person or persons desiring to delay the passage of the bill, they should be overruled and the ulterior motives given publicity.

Medical News.

CALIFORNIA.

Warrants Issued.—The executive committee of the San Francisco County Medical Society has obtained warrants for the arrest of ten individuals who, it is alleged, are practicing medicine without having first obtained licenses, as required by law.

"Quaker Doctors'" Assistant Sentenced.—Fred S. Walton, an attaché of the "Quaker doctors" who have been operating in California, was found guilty December 10, at Fresno, of obtaining money under false pretenses, and was sentenced to imprisoment for 150 days.

Personal.—Dr. James R. Curnow, San José, has broken down from excessive study and has gone to a sanitarium for needed rest and change.——Dr. J. Walter Key, San Francisco, was seriously injured by the explosion of a shotgun, November 26. ——Dr. Herman E. Mueller, Oakland, has returned from abroad.

State Board Asks Power.—The secretary of the State Board of Health has prepared a series of bills to be introduced at the coming session of the legislature. The object of these measures is to give the board increase of power, which is greatly needed, to provide for thorough registration of births and deaths, and of data with relation to disease, also to create a system of local sanitary inspection. The board has not power essential to make it a useful arm of state government. It will ask the legislature to reform the laws that the board may better guard public health, enforce proper sanitary regulations and enlist the aid and sympathy of the people, and gather reliable mortality, health and other statistics.

ILLINOIS.

Cost of General Vaccination.—Dr. Martin W. Cushing, health commissioner of Joliet, estimates the cost of general vaccination in that city at $4,000. The population of Joliet is more than 31,000.

Personal.—Dr. William J. Chenoweth, Decatur, recently celebrated his eighty-first birthday anniversary.——Dr. Louis J. Smith, Chester, has been succeeded as penitentiary physician by Dr. Milo H. Trovillion, Metropolis.——Dr. Edward Hasson, Peoria, has been elected physician of Peoria County.

Hospitals.—The State Board of Charities has recommended that appropriations of $426,500 be made for the Illinois Western Hospital for the Insane, Watertown. Of this amount $315,000 is for current expenses and $60,000 for female infirmary and dormitory buildings.——Belleville has decided to purchase the Harrison homestead, two miles south of the city, for use as a permanent isolation hospital.

Chicago.

Resignation.—Dr. Robert H. Babcock has resigned from the faculty of the College of Physicians and Surgeons.

Rush Medical College Commencement.—At the quarterly commencement of Rush Medical College, December 19, Prof. Paul Shorey of the University of Chicago delivered an address on "Some Lessons from Greek Medicine," and 17 graduates received diplomas.

The Week's Deaths.—During the week ended December 17, 509 deaths were reported, three less than in the preceding week and 41 less than in the corresponding week of 1903. The respective annual death rates per 1,000 were 13.77, 13.84 and 16.28. Pneumonia heads the list of death causes with 95; then come consumption with 57 deaths, Bright's disease, with 45; heart diseases, with 42; nervous diseases, with 27; cancer, with 24; bronchitis, with 22, and violence, with 20.

Children's Hospital Staff.—Dr. Nicholas Senn has been appointed consulting surgeon of the Children's Memorial Hospital, Dr. Frank Billings, attending physician, and the following physicians have been appointed on the attending staff: Drs. Fernand Henrotin, William W. Quinlan, Samuel J. Walker, Malcolm L. Harris, Walter S. Christopher, Hugh T. Patrick, George F. Fiske, Alfred M. Hall, William J. Class, Henry G. Anthony, Willis D. Storer, Julius W. Oswald, Norman Kerr, James P. Houston and George L. Chapman. The hospital realized about $1,500 from the benefit "Travelogue," December 19.

Smallpox.—The chief medical inspector reports 16 new cases of smallpox sent to the Isolation Hospital during the week; 15 patients never had been vaccinated; one had an old, imperfect scar; 4 were unvaccinated children under the school age. One was an unvaccinated school child in school on a false certificate of vaccination, and four came from the downtown lodging-houses. Since January 1 there have been 323 cases of the disease, of which number 22 died, 251 recovered and 50 remain in the hospital under treatment. The health commissioner has asked the city council for an emergency appropriation of $5,000 to fight the disease.

KANSAS.

Sanitarium Rebuilt.—Bonner Springs Sanitarium, which was burned in July, 1903, and is being rebuilt, will be operated as the Bonner Springs Lodge and Sanitarium Company and will be under the management of the former superintendent, Dr. Millard P. Sexton, Kansas City.

New Health Board.—The mayor of Kansas City has appointed the following board of health: Drs. Earnest J. Lutz, James W. May, Jr., Preston Sterrett, William J. Gates and C. J. Sihler. At the first meeting of the board, December 2, Dr. Lutz was elected president; Dr. Gates, vice-president, and Dr. May, secretary.

Warning.—We have received complaints that an individual calling himself Frank B. Kenneth or F. C. Burnett is calling on physicians in Kansas, offering to take subscriptions for THE JOURNAL at a discount. This man is not authorized to represent THE JOURNAL. We would again give warning not to pay money to any one on account of THE JOURNAL of the American Medical Association, unless the collector can show proper credentials.

Kansas Health Report.—During November 224 cases of diphtheria, with 42 deaths, were reported to the State Board of Health; 195 cases of scarlet fever, with 7 deaths; 318 cases of smallpox, with no deaths, and 130 cases of typhoid fever, with 15 deaths. The secretary reports that out of a total of 102 counties having county health officers only 60 have reported. From the number of cases of diphtheria and smallpox reported from these counties, should the same ratio obtain in the counties not reporting, it would show the prevalence of these two diseases to rather an alarming extent. As the season progresses, the infection of diphtheria, scarlet fever and smallpox

seems to increase in malignancy, and it is of the utmost importance that a strict quarantine be maintained in all these cases. General vaccination should be insisted on, and fresh supplies of antidiphtheritic serum should be within convenient reach of every physician in the various counties.

KENTUCKY.

Lose Books and Instruments.—Fire in the offices of Drs. John P. Ferguson and John G. Clem, Louisville, December 1, destroyed instruments and books, causing a loss of $400.

Lexington Physician Goes to Washington.—Dr. Daniel J. Healey, Lexington, has recently passed with credit the civil service examination for the position of anatomist to the Army Medical Museum and, as soon as he has received formal notice of his appointment, will move to Washington. Dr. Healey was married several years ago to Dr. Louise Bergmann, Louisville, then assistant physician to the Eastern Kentucky Lunatic Asylum, who will assist her husband in his work.

McMurtry Infirmary Nurses Graduate.—The annual commencement exercises of the Jennie Casseday Training School for Nurses connected with the private infirmary of Dr. Lewis S. McMurtry, were held December 8. After an announcement by Dr. McMurtry the address of the evening was delivered by Dr. Joseph M. Mathews with appropriate words of congratulation and advice. The address to the graduates was made by the Rev. T. M. Hawes and the pins were delivered by Dr. J. Garland Sherrill.

Smallpox.—Trigg County still has 30 or 35 cases, but the authorities have all infected houses quarantined and under guard.——In Christian County, on December 8, there were 168 cases under treatment in five localities.——In Hopkinsville during the two weeks ended December 6, 5,346 vaccinations were made.——"Dr." G. W. Waddle, Elizabethtown, was fined, December 12, for assisting a smallpox patient to escape from the health authorities.——Dr. Lee P. Trabue, health officer of Todd County, was fined $50 on December 15 for having some smallpox patients hauled through the streets to the isolation hospital.

MARYLAND.

Bids for Hospital.—Of six bids received by the Navy Department for the new naval hospital at Annapolis the lowest bid was $180,925.

Diphtheria Endemic.—An endemic of diphtheria is prevailing at Braddock Heights, Frederick County, and the public school there has been closed.

State Tuberculosis Society.—At a largely attended meeting for the organization of the Maryland Tuberculosis Society, held under the auspices of the Maryland Tuberculosis Commission, December 13, Dr. Henry Barton Jacobs was elected president.

Personal.—Dr. John S. Mathias has been appointed physician to the Carroll County jail.——Dr. Josiah S. Bowen, Mt. Washington, has been recently elected president of the medical and pharmaceutical fraternity, "Kappi Psi."——Dr. Joseph Clement Clark, Sykesville, has been elected president of the section on neurology and psychiatry of the Medical and Chirurgical Faculty of Maryland.

Medical Society Election.—The annual meeting of the Carroll County Medical Society was held at Springfield Hospital for the Insane, Sykesville, December 16. The following officers were elected: President, Dr. James H. Billingslea, Westminster; vice-president, Dr. George H. Brown, New Windsor; secretary-treasurer, Dr. Charles R. Foutz, Westminster; delegate to Medical and Chirurgical Faculty of Maryland, Dr. James H. Billingslea, Westminster; alternate, Dr. Milton D. Norris, Eldersburg, and censors, Drs. Joseph T. Hering, Westminster; Clotworthy Birnie, Taneytown, and Joseph C. Clark, Sykesville.

Baltimore.

Pneumonia Again Leads.—Pneumonia has again taken the lead in the weekly report of deaths, 25 having died from it last week.

Personal.—Dr. L. McLane Tiffany has returned from his country home.——Dr. Thomas S. Cullen has gone on a trip to the Gulf of Mexico.——Dr. Isidore Mueller, an aurist of Vienna, Austria, visited Baltimore last week.——Dr. Ernest C. Lehnert contracted blood poisoning while operating at the Northeastern Dispensary and was operated on by Dr. John T. Finney at the Union Protestant Infirmary, and is now recovering.

NEW JERSEY.

Physician Wins Suit.—A verdict in favor of the defendant by order of the court was given in the case of Seth Roberts against Dr. George W. Laws. The plaintiff claimed $5,000 damages for alleged improper treatment of an injured arm.

Camden Health Report.—The report of the health officer for the month ended December 15 shows a decrease in contagious diseases of 12 over the preceding month. There were 20 less cases of diphtheria and an increase of 18 of scarlet fever. In all there were 66 cases of contagious disease reported, with 20 deaths. Tuberculosis has now been placed on the contagious disease list.

Library Association Entertainments.—The William Pierson Medical Library Association of Essex County announces the following program for this winter:

December 6, Dr. Howard A. Kelly, Baltimore, "Appendicitis."
January 10, Dr. James E. Newcombe, New York City, "Manifestations of Rheumatism in the Upper Air Tract."
February 7, Dr. Lewis S. Pilcher, Brooklyn, N. Y., "The Operative Treatment of the Hypertrophied Prostate."
March 7, Dr. F. LeRoy Satterlee, New York City, "The Treatment of Rheumatism."
April 4, Dr. Simon Flexner, New York City, director of the Rockefeller Institute, "Some Parasitic Conditions of the Blood with Especial Reference to Tropical Diseases."
May 1, Clinical night.

NEW YORK.

Asylum Changes.—Dr. Charles H. North, who has been assistant physician at the Dannemora State Hospital since 1900, has been made superintendent of that institution. Dr. Robert B. Lamb, late superintendent of Dannemora State Hospital, has been transferred to the Matteawan Hospital, vice Dr. Henry E. Allison, deceased.

Reckless Use of Fireworks.—The New York State Court of Appeals recently handed down a decision which should have a far-reaching influence in the suppression of the reckless use of fireworks in public celebrations. On the night of November 12, during a Democratic parade on Madison avenue, New York City, there was a premature explosion of bombs and rockets which injured a large number of people, in some cases fatally. A test case for damages was instituted against the city of New York, but in the lower courts the complaint was dismissed. The Court of Appeals now reverses the judgment of the lower court and orders a new trial.

Buffalo.

Insanitary Tenements.—The health commissioner has directed the district attorney to proceed against several tenement house owners for violating the tenement ordinances.

Eye and Ear Hospital Report.—The thirteenth annual report of the Charity Eye, Ear and Throat Hospital of Erie County shows the total number of new patients, 1,817; total number of old patients, 8,339; of the 1,967 new cases 1,221 were diseases of the eye, 257 diseases of the ear and 489 diseases of the nose and throat. The number of patients treated since the opening of the hospital was 22,439. The hospital received an appropriation of $1,850 last year from the county.

Report of Health.—The monthly report of the Department of Health for November shows a death rate of 13.70 per 1,000 per annum. The principal causes of death were as follows: Consumption, 38; diphtheria, 15; measles, 9; typhoid fever, 5; debility, 43; alcoholism, 5; cancer, 19; apoplexy, 10; meningitis, 12; valvular heart disease, 21; pneumonia, 50; appendicitis, 5; gastroenteritis, 6; acute nephritis, 26, and violence, 30. Total deaths for November, 434, as compared to 438 for November, 1903.

New York City.

Large Sum for Hospital Assured.—The board of managers of the Seney Hospital, Brooklyn, has announced that the conditional $300,000 has been raised and that it is now assured of the gift of $125,000 offered.

Contagion Hospital Christmas.—The health commissioner has asked for funds and gifts for the patients in the hospitals for contagious diseases, namely, the Willard Parker, the Riverside, the North Brother Island and the Kingston Avenue Hospital in Brooklyn.

"Physician" or "Doctor."—The Society of Medical Jurisprudence at its last meeting took action leading toward the stricter and more exact use of words, which ought to be commended by all people interested in good English. Hereafter the society is to designate its medical members as "physicians" and not as "doctors."

Contagious Diseases.—There have been reported to the sanitary bureau for the week ending December 10, 368 cases of diphtheria and croup, with 31 deaths; 345 cases of tuberculosis, with 160 deaths; 208 cases of scarlet fever, with 14 deaths; 138 cases of measles, with 8 deaths; 87 cases of typhoid fever, with 19 deaths; 112 cases of chickenpox, and 13 deaths from cerebrospinal meningitis.

Continued Work for Pure Milk.—The Health Department inspectors who have been investigating the up-state dairies have reported that the Blooming Grove dairy in Orange County is in an unsanitary condition. As a result the permit of the Metropolitan Milk and Cream Company, which has been dispensing milk from this source, has been revoked by Health Commissioner Darlington.

Tuberculosis Dispensary.—A new dispensary for the special treatment of pulmonary tuberculosis was opened December 19 by the New York Throat, Nose and Lung Hospital. The patients will live at home and will visit the dispensary three or more times weekly for treatment, advice, medicines, etc. By this plan it is believed that each person will be made a center for disseminating information for controlling and stamping out the disease.

Health Department and the Subway.—At a meeting of the advisory board of the Health Department the condition of the subway was discussed. This body was inclined to agree with Dr. Chandler, who has continued his researches which have resulted in confirming his first statements, that there is no lack of oxygen in the tunnels. However, it was the opinion of the majority that a change in the roadbed would be advisable. This change would consist in altering the present rock ballast roadbed for one of asphalt or concrete at the stations and for 50 feet on either side, as this would insure cleanliness.

The Mosquito Must Go.—At the meeting of the National Mosquito Extermination Society, held December 14 and 15, it was decided to change the name of this association, and it will henceforth be known as the American Mosquito Extermination Society. Among those who contributed interesting papers were Dr. E. Porter Felt, New York state entomologist; Dr. Walter Wyman, surgeon general of the United States Public Health and Marine-Hospital service; Dr. M. J. Rosenau, director of the Hygienic Laboratory at Washington, D. C.; Dr. Bramley, and Dr. Quitman Kohnke, president of the health board of New Orleans. It was very clearly demonstrated that the mosquito is a menace to health with which we should not temporize, and it was the conviction that the time would come when those in authority would act against the mosquito as they now do against smallpox.

PENNSYLVANIA.

Personal.—Dr. Maurice B. Oberholtzer has been appointed burgess of Soudertown.——Dr. J. Frank Shaw, health officer of York, has resigned.

Smallpox Situation.—The report of the State Board of Health for November shows that there were 219 cases of the disease, with no deaths, as compared with 745 cases and 74 deaths in November, 1903, and 1,248 cases and more than 100 deaths last December. Of the whole number of cases reported last month 45 occurred in Harrisburg, 50 in Morris Run, Tioga County, and 50 in Dover Township, York County. Allegheny County, where the disease was prevalent last winter, reported only one case, and the only places other than those already named where more than three cases were reported were as follows: North Lebanon Township, 15 cases; York, 9 cases; Philadelphia, 8 cases; Butler County, 7 cases; Conewago Township, York County, 6 cases; Cole's Patch, Schuylkill County, 4 cases; Johnstown and Blossburg, and Covington Township, Tioga County, 3 cases each.

Philadelphia.

Desire Consumptive Camp.—At the last meeting of the County Medical Society Dr. Robert N. Willson, Jr., introduced a resolution petitioning the legislature to appropriate $50,000 for the establishment of camps for consumptives. The resolution will be acted on at the regular meeting, December 27.

Personal.—Dr. Orem M. Deems has been appointed resident surgeon to the Wills Eye Hospital.——Dr. M. F. Sewall has been appointed resident physician in Girard College to succeed Dr. Sidney J. Repplier, resigned.——Dr. W. J. Wanless, principal of the Miraj Medical School and superintendent of the Miraj Leper Asylum, in India, addressed the students of the University of Pennsylvania, December 15.

Typhoid Fever.—During October there were 335 cases reported to the Bureau of Health, equivalent to an average weekly rate of approximately 6.3 cases per 100,000 population. During this period not a single case of typhoid was reported from that section of the city in West Philadelphia, with a population of 46,805, which is supplied with filtered water from the Belmont plant, while the weekly average of cases in the same section which has unfiltered water, with a population of 101,566, was 7.84 per 100,000 population.

Many Unvaccinated Infants.—During a recent vaccination campaign the health authorities discovered in one section of the city about 550 unvaccinated people. Of this number the largest proportion were of infants less than six or seven months old, who were born after the last systematic vaccination canvass. This is significant from the fact that of eight patients who have been admitted to the Municipal Hospital with smallpox during November two had never been vaccinated and were less than seven months old. Efforts are being made by the Health Department to have infants vaccinated.

North Branch Society Election.—The North Branch of the Philadelphia County Medical Society, the pioneer "branch" in the new movement of organizing the medical profession of American cities, is now completing its fourth year. The officers for 1905 are: Dr. A. Birn Hirsh, chairman; Dr. T. Turner Thomas, clerk; Drs. W. Harsey Thomas, W. Harmar Good and Anna M. Reynolds, committee on scientific business; Drs. William E. Parke, H. Brooker Mills, Clara T. Dercum, Wilbur C. Hammond, Carle L. Felt, Rose Hirschler, Samuel P. Gerhard and Wendell Reber, committee on membership.

Blockley Dinner.—The annual dinner of the Association of Ex-Residents and Resident Physicians of the Philadelphia Hospital (Blockley), was held December 3, and 72 members were present, including 17 of the present resident physicians. Dr. James B. Walker presided and the following officers were elected: President Dr. Edward L. Duer; vice-presidents, Drs. Horatio C. Wood and Dr. Roland G. Curtin; secretary, Dr. Edward R. Stone, and executive committee, Drs. Alfred Stengel, Richard C. Norris, Thomas C. Potter, J. Chalmers DaCosta, Augustus A. Eshner, George Y. MacCracken and H. B. Calhoun.

Health Report.—The total number of deaths recorded for the week numbered 519, as compared with 453 for last week and 579 for the corresponding period of last year. Pneumonia was responsible for the largest number of deaths, 70 being due to this disease, while 33 more deaths were due to acute inflammation of the respiratory tract. Seventy-two deaths were due to pulmonary tuberculosis, 26 to apoplexy, 50 to heart disease, 42 to Bright's disease, 12 to cancer and 15 to diphtheria. The contagious disease cases reported numbered 213, with 26 deaths, as compared with 260 cases and 27 deaths for the previous week. Contagious disease is present as follows: Diphtheria, 90 cases; scarlet fever, 53 cases; typhoid fever, 69 cases, and smallpox, 1 case.

FOREIGN.

Virchow Fund for Combating Infant Mortality.—The heirs of Rudolf Virchow have presented to the city of Berlin $12,500, to serve as an endowment fund to aid in the campaign against infant mortality.

Tuberculosis Museums in Germany.—Carlsruhe is planning a still more elaborate tuberculosis museum than the one now established at Charlottenburg. Arrangements are being made by which parties of working people will be enabled to visit the museum from all parts of the country.

Proposed Memorial to Riegel.—Friends and former pupils of Prof. Franz Riegel of Giessen, who died last August, are invited to contribute toward a memorial to be erected on the scene of his labors to perpetuate the memory of the great clinician to future generations. Contributions are received by Drs. Volhard and von Tabora, privat docents at Giessen. The appeal is signed by the dean of the medical faculty and others.

Zurich Votes in Favor of Restriction on Medical Practice.—The popular vote cast in the canton of Zurich on the question whether to abolish or maintain the regulations restricting the practice of medicine to registered practitioners resulted in a victory for regular medicine. The proposal to abolish the restrictions—mentioned on page 1882—was voted down by a vote of 51,319 against 22,881.

Nursling Consultations in Berlin.—The Berlin authorities have recently established four stations where mothers can bring their babies for advice and obtain milk or other food

for the child. Berlin now has three kinds of the Fürsorgestellen as the Germans call them, some for tuberculous, some for infants and one for cancer subjects. They aim to watch over the applicants not only on the spot, but in their homes, and to improve their environment at need. Hamburg has six salaried women whose duties are to watch over the infants in the city asylums.

Correspondence.

The Relation of the Physician to Proprietary Remedies.

ST. LOUIS, Dec. 13, 1904.

To the Editor:—In your issue of December 3, under the heading "The Relation of the Physician to Proprietary Remedies," Dr. William J. Robinson indirectly assails the integrity of two houses with which I am connected. I feel it my duty to call your attention to a number of errors and gross misrepresentations, and in justice to these concerns, reputable manufacturers and patrons of your advertising pages for fifteen years, you should place this matter in its proper light before your readers.

I would not undertake to answer this article as a whole, because its labored efforts are apparent and its inconsistency answers itself. Nor would I take the time to correct any statement emanating from Dr. Robinson were it not given space in THE JOURNAL of the American Medical Association. I do not question the right of Dr. Robinson or of any physician to approve or to disapprove any chemical or pharmaceutical product, but I do protest against the malicious way Dr. Robinson speaks of seng and chionia as "quack nostrums," classifying them with pain-killers and cure-alls, and their manufacturers among "ignoramuses" and "saloon-keepers," "without the slightest idea of chemistry, materia medica or therapeutics." In point of fact, seng and chionia are manufactured by the Sultan Drug Company and the Peacock Chemical Company, respectively; houses whose reputation and standing have never been questioned. Their manufactory is in the hands of an experienced pharmaceutical chemist, and their exploitations are strictly ethical. Never in their entire existence have they deviated one iota from their chosen field, as manufacturers of ethical pharmaceuticals. Their advertisement has never been seen by anyone excepting in reputable medical journals. It is true that the working formulæ for seng and chionia are not published, but this is done to protect those physicians who are daily employing them from the very inconvenience that Dr. Robinson has with the iron and manganese product he speaks of. If he were to prescribe our Peacock's bromids, the formula for which we plainly give, he would, no doubt, experience the same trouble. We have examined substitutes for this product, even some that were made by manufacturers whose business it is to make these substitutes for unscrupulous druggists, and who should know better, and found them to contain absolutely no bromid of lithium, and in some cases they were merely mixtures of bromids of potassium and sodium. In the case of chionia and seng, the physician, the patient and the manufacturer have some protection against this evil. Many physicians who wish to employ *Chionanthus virginica* when it is indicated, prescribe chionia, because it best represents the true therapeutic action of that drug. Its dose is well known, just as is the dose of a tincture, without knowing or caring whether it is two, four or six ounces of the drug to the pint. And again, seng, a pleasant elixir of the *Panax schinseng*, has many friends in the profession as a digestive tonic—and we feel satisfied that the practicing physician does not want its working formula any more than he would want to refer to his textbook to ascertain its exact composition each time he wished to prescribe compound tincture of cinchona.

The products of the Sultan Drug Company and of the Peacock Chemical Company have been endorsed by more than forty thousand practicing physicians in this country and England, and to these and others who may still become prescribers of their preparations, I repeat the pledge of these concerns, to maintain the strict ethical bearing toward the physician, which they have always sustained.

FRED W. SULTAN,
President Sultan Drug Company.
Secretary-Treasurer Peacock Chemical Company.

Duplicate Twins and Double Monsters.

NORTHAMPTON, MASS., Dec. 15, 1904.

To the Editor:—As I have recently become interested in a line of investigation which requires the careful examination of all forms of double monsters, I would be extremely grateful for the gift or loan of fetal or new-born specimens exhibiting any grade of this phenomenon.

As such cases are rare, there is a natural tendency to store them up as museum specimens, in which condition the benefit to be derived from them is inconsiderable; while a thorough anatomic investigation would yield far more important results. As I am working on a definite problem, I do not care at present for other forms of monsters, such as those of microcephalous, acephalous or amorphous types, but only for those which exhibit a doubling of any axial part, ranging from single individuals with doubled median parts to two complete individuals united at a single point. Similar cases occurring among the lower mammals, or, in fact, any vertebrate, will be of nearly equal interest. For fresh material, the best preservative for my purpose is 5 per cent. formalin; i. e., the commercial article mixed with water in proportion of 1—20 or thereabouts, although material preserved by any other method will be of value. In specimens larger than four-months embryos the thoracic and abdominal cavities should be freely opened to insure complete preservation.

For a more detailed description of the types of monster I especially desire, I may refer the reader to the enumeration of the various forms, grouped under diplopagi in my article[1] in the *American Journal of Anatomy*, vol. iii., No. 4, September, 1904. HARRIS HAWTHORNE WILDER.

Zoological Laboratory, Smith College.

Queries and Minor Notes.

ANONYMOUS COMMUNICATIONS will not be noticed. Queries for this column must be accompanied by the writer's name and address, but the request of the writer not to publish his name will be faithfully observed.

PATHOLOGIC LABORATORIES.

LINCOLN, NEB., Dec. 9, 1904.

To the Editor:—Wishing to obtain information in regard to the states in which hygienic or pathologic laboratories have been established where pathologic material can be sent for examination without charge, I would esteem it a great favor to receive answers to the following questions: 1. In what states have such laboratories been established? 2. What appropriations have been made in the several states by their legislatures for carrying on this? 3. How many men have been required in each case to do the work? 4. How much of each appropriation was used in the payment of salaries?

H. H. WAITE.

ANSWER.—1. Chapin, in "Municipal Sanitation in the United States," names the following states as equipped with bacteriologic laboratories: Colorado, Louisiana, Delaware, Maryland, Massachusetts, Minnesota, New Jersey, Ohio, Rhode Island, Tennessee and Vermont. Answers to questions 2, 3 and 4 can be best obtained by application to the secretaries of the respective boards of health. The expenditure doubtless varies from year to year as do the number of persons engaged in the work and their respective salaries. The salaries paid in municipal laboratories range all the way from $3,000 a year to a small fixed sum (e. g., $1) for each examination made.

OPPORTUNITIES FOR PRACTICE IN THE PHILIPPINES.

COLUMBIA, MO., Dec. 14, 1904.

To the Editor:—1. To whom must application be made for the position of contract surgeon in the United States Army in the Philippines? 2. Do you think it advisable for a young physician to go there? 3. Is it necessary for a graduate of an American College to pass an examination to practice medicine in Porto Rico?

J. M. SANTIAGO.

ANSWER.—1. Surgeon General, U. S. A., Washington, D. C. 2. Yes, if assured of a position, as the experience will be valuable. Otherwise no, as too many physicians are there already who have no work. 3. No.

1. EDITOR'S NOTE: See editorial in this issue.

Marriages.

GEORGE W. CHABOT, M.D., Otway, Ohio, to Mrs. Sadie Taner of Peebles, Ohio, December 7.

CLEMENT ANDARIESE PENROSE, M.D., to Miss Helen Stowe, both of Baltimore, December 14.

GEORGE R. TUBBS, M.D., Stearns, Ky., to Miss Beulah Alford of Alfordsville, Ind., December 25.

ARTHUR F. STOTTS, M.D., Ehrenfeld, Pa., to Miss Caroline A. Greene, of Easton, Pa., December 7.

FRANK J. WAGNER, M.D., Scranton, Pa., to Miss Anna Lulu Diaz of Homestead, Pa., December 20.

JOHN EDGAR FRETZ, M.D., to Miss Frances Josephine Rodenbough, both of Easton, Pa., December 7.

Deaths.

John W. Porter, M.D. Kentucky School of Medicine, Louisville, 1883, of Pittsburg, Kan., a member of the American Medical Association, Kansas State Medical Society, one of the organizers of the Southeast Kansas Medical Society, and health officer of Crawford County, died at Mount Carmel Hospital from peritonitis following an operation for appendicitis, December 14, aged 49.

Aloysius G. Blincoe, M.D. University of Louisville, 1868, a member of the American Medical Association; state, district and county societies; one of the best-known physicians of central Kentucky, and an ophthalmologist of renown; a Confederate veteran, died at his home in Bardstown, Ky., from appendicitis, after a brief illness, December 10, aged 60.

Bickerton L. Winston, M.D. New York University, New York City, 1885, a member of the American Medical Association; twice a member of the state legislature and a member of the Democratic committee of Virginia, died at his home in Hanover Court House, Va., December 11, after a long illness, aged 42.

Cary Judson Gill, M.D. Rush Medical College, Chicago, 1866, a member of the American Medical Association, a veteran of the Civil War, and a resident of Riverside, Cal., since 1876, died suddenly from paralysis, December 6, while driving near his home, after an illness of two years, aged 67.

James M. Carden, M.D. Medical Department of the University of Tennessee, Nashville, 1887, of La Follette, Tenn., at one time representative from Anderson and Knox counties in the state senate, died one day after an operation, at the Knoxville General Hospital, December 8, aged 50.

Jesse Jackson Jacobs, M.D. Medical Department Arkansas University, Little Rock, 1898, a member of the American Medical Association and a prominent physician of Franklin County, Arkansas, died at his home in Webb City from hematuria, December 7, after a brief illness.

Levi Curtis, M.D. Jefferson Medical College, Philadelphia, 1847, a surgeon in the Army during the Civil War and a member of the Philadelphia County Medical Society and the Northern Medical Society, died at his home in Philadelphia from heart disease, December 12, aged 82.

Oliver L. Hutzel, M.D. Jefferson Medical College, Philadelphia, 1903, of King's Mills, Ohio, interne in the Williamsport (Pa.) Hospital, died at Comfort, Texas, from chronic ulcerative phthisis, December 9, after an illness of one year, aged 24.

W. S. McMurtry, M.D. University of Louisville Medical Department, 1844, a veteran of the Mexican War; once state senator; for 55 years a resident of California, died at his home in Los Gatos, December 8, after a long decline, aged 86.

Howard T. Smith, M.D. Michigan, 1900, of Bridgman, Mich., who was struck by a train at Stevensville, Mich., while driving across the Pere Marquette tracks, December 2, died at Mercy Hospital, Benton Harbor, Mich., December 4, aged 36.

Arch. E. McNeall, M.D. Medical Department of the University of Iowa, Keokuk, 1868, surgeon of the Ninety-ninth Illinois Volunteer Infantry during the Civil War, died at his home in Quincy, Ill., December 14, aged 78.

Samuel S. Turner, M.D., acting assistant surgeon United States Army since 1869, died from Bright's disease, December 11, while on his way from his station at Fort Columbia, Wash., to Washington, D. C., aged 70.

W. M. Carney, M.D. Hospital College of Medicine, Louisville, 1903, was shot six times in a street fight with his former partner, Dr. Edward C. Courtney, at Neave, Ky., December 9, and died half an hour later.

Robert J. Barry, M.D. College of Physicians and Surgeons in the City of New York, 1890, city health officer of Ansonia, Conn., died at his home in that city, November 15, from meningitis, aged 35.

David Kirkpatrick, M.D. Rush Medical College, Chicago, 1860, one of the oldest practitioners of Whitley County, Indiana, died at his home in Larwill, December 5, after a lingering illness, aged 68.

Lorenzo W. Whitney, M.D. Medical Department of Western Reserve University, Cleveland, 1885, of Chicago, died suddenly from heart disease, on an elevated train in Chicago, December 15, aged 56.

Richard H. Barber, M.D. Royal College of Physicians and Surgeons, Edinburgh, Scotland, 1887, of Gardiner, Douglas County, Ore., was drowned while making a professional call, December 4.

John T. Watson, M.D. Jefferson Medical College, Philadelphia, 1850, formerly a practitioner of Nash County, N. C., died at the home of his daughter in Norfolk, Va., December 6, aged 81.

William Kroeger, M.D. University of Wooster Medical Department, Cleveland, 1881, a noted priest and physician of Epiphany, S. D., died at his home in that place, December 8, aged 51.

Martin L. Yost, M.D., twice coroner of Lehigh County, Pa., one of the oldest physicians of Allentown, while driving, December 3, was struck by a trolley car and instantly killed, aged 71.

Charles F. Norton, M.D. Medical Department University of Texas, Galveston, 1899, died at his home in Asheville, N. C., from tuberculosis, December 14, after an illness of two years.

Harry J. Strack, M.D. Medical College of Ohio, Cincinnati, 1901, a district physician of Cincinnati, died suddenly at his office in Cincinnati, December 10, from heart disease, aged 24.

Joseph Albert Starr, M.D. University of Georgetown (D. C.) Medical Department, 1902, was recently found dead in his room in Washington, D. C., from gas asphyxiation, aged 30.

Solomon K. Barndt, M.D. Jefferson Medical College, Philadelphia, 1863, died at his home in Alburtis, Pa., December 6, after an illness of three days, from heart disease, aged 62.

Jacob Schaefer, M.D. University of Heidelberg, Germany, 1848, once coroner of Meigs County, Ohio, died at his home in Rock Springs, December 3, after a brief illness, aged 77.

Henry S. Babbitt, M.D. Berkshire Medical College, Pittsfield, Mass., 1848, died at his home in Dorchester, Boston, Mass., December 10, after on invalidism of five years, aged 78.

Melvin Wheeler, M.D. Medical College of Ohio, Cincinnati, 1884, died at his home in Covington, Ky., from hemiplegia, November 8, after an illness of four years, aged 52.

Charles K. Law, M.D. New York University, New York City, 1893, died at his home in Jersey City, N. J., December 13, from peritonitis, after a short illness, aged 40.

James F. Kidder, M.D. Indiana, 1897, a pioneer practitioner of Jay County, Ind., died at his home in New Mount Pleasant, December 2, from chronic gastritis, aged 65.

Frank A. Thorne, M.D. College of Physicians and Surgeons of Chicago, 1891, died suddenly at his home in Seattle, Wash., November 26, from heart disease, aged 44.

Charles E. Birtwell, M.D. New York University, New York City, 1884, of Lawrence, Mass., died at the home of his sister in Providence, R. I., December 8, aged 43.

David W. Birge, M.D. Cleveland Medical College, 1848, who retired from practice in 1894, died at his home in Hector, N. Y., November 24, aged 82.

George E. Butcher, M.D. Jefferson Medical College, Philadelphia, 1864, died at his home in Mauricetown, N. J., from heart disease, December 13.

John Taylor Wells, M.D. Indiana, of Indianapolis, died at the Indiana Central Hospital for the Insane, Indianapolis, December 4, aged 65.

John Moon, M.D. University of Buffalo (N. Y.) Medical Department, 1872, died at his home in Dolgeville, N. Y., December 6, aged 79.

John F. Fisher, M.D. Jefferson Medical College, Philadelphia, 1872, died at his home in Philadelphia from apoplexy, December 9, aged 60.

Frederick Fisher, M.D. University of Leipzig, Germany, 1882, formerly of Alameda, Cal., died at Santa Cruz, Cal., December 5, aged 59.

Francis L. Foscue, M.D. Jefferson Medical College, Philadelphia, 1884, of Demopolis, Ala., was robbed and murdered, December 17.

William H. Bigler, M.D. Pennsylvania, 1871, died suddenly on the street in Philadelphia from heart disease, December 10, aged 64.

Eliphalet E. Houghton, M.D. Castleton (Vt.) Medical College, 1853, died at his home in Schevinus, N. Y., December 2, aged 73.

Franz Simon, M.D. University of Giessen, Germany, 1848, died at his home in Manitowoc, Wis., December 13, aged 81.

R. M. Wade, M.D. University of Maryland School of Medicine, 1875, died at his home in Athens, Ga., December 7, aged 64.

John J. Garrigus, M.D. Indiana, 1897, died suddenly at his home in Tangier, Ind., from heart disease, November 27.

William E. Gallagher, M.D. Detroit Medical College, 1884, fell dead at his home in Milwaukee, November 14.

Zebina Z. Bryant, M.D. Illinois, 1881, died at his home in Hennepin County, Minn., November 28, aged 65.

John T. Austin, M.D., died at his home in Nixon, Texas, December 4, from pneumonia, after a short illness.

W. S. Barrett, M.D., of Social Circle, Ga., died at his home, December 11, aged 84.

THE PURE-FOOD BILL.

Abstract of Discussion of This Important Bill in the United States Senate.

We quote and abstract from the *Congressional Record* the following account of the daily proceedings in Congress concerning the Pure-Food Bill:

Thursday, December 8.

Senator Heyburn of Idaho asked leave to call up the bill, and Senators Cullom of Illinois and Aldrich of Rhode Island asked that the bill be read in full. To call up the bill at that time required unanimous consent. Senator Tillman of South Carolina objected, because of other business which he desired to have considered, and the request of Senator Heyburn was therefore not granted.

Monday, December 12.

The Senate took up the consideration of the bill, which was read with the amendment reported from the committee on manufactures. The bill was printed in THE JOURNAL April 2, 1904, page 910. The amendment is to strike out all after the enacting clause and to insert new matter which, in the opinion of that committee, covers the desired ground to better advantage. Senator Heyburn explained that the House bill proposes to establish a new bureau to execute the provisions of the bill, and that the Senate bill contemplates this work being done by the existing departments of the government. He made the general observation that every state had passed some law on the subject of pure food, and said that since no one would defend the fraudulent manufacturer in his adulteration it only remained to determine the character of the bill to be enacted.

Senator Carmach of Tennessee asked the reason for the provision prohibiting exportation of adulterated goods to foreign countries.

Senators McCumber of North Dakota, Spooner of Wisconsin and Hepburn gave the following reasons: 1. Reciprocity: that is, we should prevent our citizens from doing to other countries what we do not want their citizens to do to us. 2. Protection of industry: that is, we should protect our honest exporters from unjust competition with those who adulterate their goods. 3. Reputation of American goods: that is, our name in foreign markets should stand for purity and integrity. 4. Increase of trade: that is, a good reputation will increase our commerce.

PHYSICIANS AND MEDICAL ASSOCIATIONS HEARD FROM.

Senator Heyburn said: "The demand for this class of legislation comes from those who have most nearly at heart the health and welfare of the people. I have here something like 3,000 requests from physicians of good standing; I have hundreds of petitions from medical associations; I have on my desk here the petition of the American Medical Association asking for the enactment of this legislation. They had the bill before them when they passed those resolutions."

NEED OF PUBLICITY CONCERNING ADULTERATIONS.

Senator Stewart of Nevada expressed the fear that the bill will not pass, but agreed that something ought to be done. He suggested that the Secretary of Agriculture be given $200,000 to make and publish analyses of adulterated foods, etc., and that the resultant awakening of the people on the subject would make it easy for the states and Congress to legislate. Continuing, he said:

"I do not think the country has any idea of the extent of the poisons that are administered in the food that is sold and eaten in this country. I think it is sapping the foundation of the constitutions of our people. If we had to raise soldiers now as we did in 1861 I do not believe that throughout the country we would find as large a percentage of young men fit for hard service as there were at that time, and I believe the degenerated condition of many of the young men results in a great measure from the poisonous food that they eat—the alum in the bread, the formaldehyd in the milk, the meats, and so on. I need not go on to enumerate them now. Those things are destroying the stomachs and injuring the health of the people.

"But in order to apply the remedy we first want to have the evil thoroughly exhibited. An individual can not publish the list; no professor, or doctor, or other man can publish it. The press will not publish it. The patronage is on the other side. They will cry him down if he attempts it. No individual can do it. But it can be done effectively by the Department of Agriculture through its Bureau of Chemistry, where they have a man at the head who understands the subject and who has done a good deal of good so far. What we want to do is to give him money enough, so that he can go forth and analyze and publish the result, and the people will find the remedy for this evil.

"I am afraid my friend from Idaho can not get his bill through, and I am afraid if he does it will not be exactly fitted to the condition of things. If we had all the facts the country would no doubt demand a remedy for such a great evil. I believe the first thing to do is to put in the agricultural appropriation bill a lump sum and tell the Secretary of Agriculture to look into the question, and he will do it in a way that will induce legislation in the states and in Congress, so far as necessary. I have no doubt of that."

REASONS FOR PASSING THE BILL.

Senator Heyburn gave the following vigorous and most pertinent answer:

"Mr. President, the demand for the passage of this legislation, or this class of legislation, comes to us from the states—from the legislatures of the various states. They demand that we shall co-operate with them in carrying out the principle they have undertaken to deal with. They have undertaken, in several states, to the extent and limit of their jurisdiction, to prevent the introduction and use of deleterious foods and drugs, and they complain that they can not enforce their laws; that their laws are not effective because of the fact that other states and countries may force on them without their present knowledge or will substances that they do not permit to be manufactured and sold within the state. That is the difficulty. They are not asking us to inaugurate the subject of legislation upon pure food. They are asking us to co-operate with them. They have already spoken through their legislatures as Congress spoke when it had the matter before it.

"It seems to me that the subject is one which should receive consideration and ultimate action, because it is impossible for the states to prevent, under the unbroken-package law, the importation within their borders of the very substances which their own people are prohibited from manufacturing or selling within their states.

"If this proposed law is found to be insufficient, if it is found to be open to objection, let us amend it here and har-

monize it with the House bill. Let us enact some law on the subject. That is the important thing to do. . . .

"We have ample time to consider the question and all the proposed objections and amendments that may be offered to the bill. Let us act. Let us heed the call of the states and the people and protect them not only against their own weakness, as exhibited by the manufacture and sale of these articles among ourselves, but let us protect them against the importation of these substances from other countries. Let us protect each state against the cupidity and greed and fraud that come into it over the borders from its neighbor or from some other state."

Senator Heyburn then closed, because the time had arrived for other business.

Senator McCumber made the following appeal:

"I sincerely hope, Mr. President, that those even who are opposed to this bill will at least co-operate with us in assisting us to secure a vote during the present session. In the last four years this bill, or substantially the same bill, has passed the House on two different occasions. By the manipulation of appropriation and other bills, especially by those who have been opposed to the enactment of this proposed law, we have been unable to secure a vote in the four years. It does seem to me that after the House has twice expressed itself strongly on this subject by an overwhelming majority we should at least have the opportunity in this body during the present session of securing an expression of the Senators on a question which affects every state in the Union and every individual in every state in the Union."

Tuesday, December 13.

On motion the House agreed to the consideration of the bill, and Senator McCumber spoke at length. After using the pointed argument which we have quoted editorially, he urged the magnitude of the evil, and stated that the value of the adulterated and misbranded goods sold annually in the United States is about $3,000,000. He said:

NEED OF PROTECTING THE STATES.

"The fact that nearly every state in the Union has passed stringent pure-food and pure-drug laws is evidence of the existence of the necessity for that character of legislation. The fact of their inability to enforce those laws makes it evident to us that there is some reason outside of the authority of the state whereby the state is not enabled to enforce its own territorial laws.

"Now, is the state entitled to this protection? By the silence of Congress on the subject we impliedly say that the state shall be the dumping ground of all spurious, adulterated and misbranded goods, and the state itself is absolutely at the mercy of manufacturers and shippers of that character of goods; and why? Because by the construction of the interstate commerce clause of the Constitution it has been held that the failure of Congress to pass on the subject of what may be imported into a state is evidence of the desire of Congress that any goods that can be said to be marketable may be shipped into any state in unbroken packages, and in that condition may be sold. Therefore, the state itself can not reach the goods until they have become lost in the mass of the property of the state; and when they have so become lost, I submit that the state power to reach and punish the real offender is absolutely gone. The evil is rooted in soil outside of the state and over which the state has absolutely no jurisdiction."

Continuing Senator McCumber gave illustrations of the handicap on state authorities at present. He urged that the honest manufacturer is worthy of protection, and said further:

"The bill as it is drafted injures no legitimate business; it does not determine what shall be shipped into any state. It does not determine what shall be done with it in the state. It neither prohibits nor interferes with any commerce whatever. It simply says that all goods must be unmasked before they cross the state line. No legitimate dealer can object to a law of that character. It does not prevent a man from buying what he desires to eat or what he desires for a drug. It simply declares that he shall be protected in buying what he does want either for food or in the drug line. I anticipate that no person could urge any objection to a law of that kind.

"It is not partisan in any sense. It does not in the least degree infringe state rights or interfere with them in any way. The Federal law will stop exactly where the state law begins, and it will not attempt to interfere in the slightest degree with the police power of the state. The provisions add no new machinery of government. They add no additional expense in order to carry out the law. There is a wrong impression, as I have suggested, that this is a law to fix standards of foods, and that in some man is placed the power to determine what may be sold and what may not be sold in the country. On the contrary, it is nothing of the kind. It is simply a bill to provide that all articles shall be sold for exactly what they are, and if the state itself has a power to declare, and if it is proper for it to declare, what shall not be sold within its boundaries, then the nation has the power to declare, and it is also proper for it to declare, under the power given in the interstate commerce clause of the Constitution, what shall not pass the borders of a state. That is all this bill seeks to do—to supplement the power of the state to prevent the sale of adulterated and misbranded goods in the state. . . .

"Now, as I have stated, this proposed law keeps entirely outside of the state itself. The definitions are somewhat voluminous, it may be, but they are all clear; they are all concise. They are designed simply to protect those who are innocent and to punish those who are guilty. There has been no change in the measure as it came from the House in the matter of definitions. They have been rearranged so as to conform more particularly to their headings, 'adulterated' and 'misbranded,' and nothing further than that."

THE RESPONSIBILITY OF THE DEALER.

Senator Platt of Connecticut then asked an explanation of one provision of the bill. He said:

"The object of this bill is a good one, but its terms are so involved that I am not sure I understand just what it does provide and mean, and therefore I wish to ask the Senator from North Dakota whether he understands that this bill provides that any person who orders goods from another state, and to whom they are shipped, does, by receiving them only, make himself liable to prosecution and penalty unless the goods are accompanied by a guaranty from the person of whom he buys them that they are pure? Does the bare receiving of them make him liable? To illustrate, suppose a grocery merchant, a retailer, in Connecticut orders from a wholesale grocery store in New York some packages of coffee. Now, does he, by receiving those packages of coffee, make himself liable to prosecution unless they are accompanied by the guaranty of the person from whom he buys them that they are pure?"

Then followed a long discussion as to the interpretation of the words of the clause referred to. Senator Spooner joined Senator Platt in the view that the bill would make innocent recipients liable to arrest and prosecution for even receiving adulterated or misbranded goods unless a guaranty from the manufacturer accompanied the goods. Senator McCumber admitted that the change of one word might be advisable to remedy this.

Senators Platt and Spooner further contended that the importer should be protected by the passage of the articles through the customs house, where, supposedly, the government had examined them, and, further, that since the bill makes it an offense for any one to receive impure goods, the importer may innocently receive such goods, and therefore a provision in the bill ought to be made excepting from prosecution the importer who has a guaranty from the foreign merchant.

Senator McCumber showed the fallacy of this by explaining that, if such a provision were added, the importer could be protected in selling adulterated goods by simply having a guaranty from a foreign merchant, and that the United States has no power to prosecute the foreign merchant.

It was further explained that the expression "knowingly receive adulterated goods" can not be used, because experience in the state shows that the majority of offenders can escape when such language provides a loophole.

Senator Spooner said: "Then are we not put to the alternative of not regulating on the one hand or on the other regulating in this way, to the obvious injustice of a great body of honest American citizens?"

Senator McCumber said: "I can not see where any injustice will necessarily or even probably be done them under a law of this kind. We have a great many cases of like character. It is made a criminal offense probably in every state in the Union to sell a minor liquor. A man may be absolutely innocent of the fact that he is a minor when he sells it, but nevertheless he is compelled to know what he is doing; it is considered necessary that he should know."

Attention was called to the fact that the bill puts the burden on the dealer of knowing that he is handling genuine products. This was the intention.

Senator Platt objected to the bill on the ground of its complications. He considered that it required much study to ascertain just what was intended by it. He thought a simpler way would be to define "adulterated" or "misbranded" goods, and to require all goods shipped between states to have on them a guaranty as to purity, etc. He said this was only an opinion, as he had not studied the subject deeply.

Senator McCumber declared that general views make a matter appear simple, but that to draft a law to guard the rights of citizens under those general provisions becomes often a very complex matter. So it had been in this case. He stated further that the bill covered the points laid down by Senator Platt. It defines adulterated and misbranded goods, and it requires all such goods to be correctly labeled.

Wednesday, December 14.

The bill was taken up, on motion, and the discussion resumed. Senator McCumber quoted from a statement by the food commissioner of North Dakota concerning the adulteration of ham, sausage, canned chicken, salmon, peas, mushrooms, tomatoes, etc., which showed that 80 to 90 per cent. of such goods were adulterated or had preservatives in them.

Senator Aldrich of Rhode Island brought up the protection to the innocent dealer who purchases goods supposedly genuine.

Senator McCumber showed that he is protected by the guaranty of the manufacturer in this country, but that he must himself see to the purity of the goods that he buys of a foreign merchant. He said:

"The object of requiring a guaranty in the states is that we may follow up the article to the manufacturer and may hold the manufacturer of the article responsible. Such a provision could not apply, of course, where the article is imported from a foreign country. This country has no jurisdiction, of course, over the producer in a foreign country, and for that reason it was deemed unnecessary and improper even to have the same provision in reference to the importation of foreign products. In addition to this, we now have a national law which provides for the inspection of all these imported articles, and I believe it is working very well. There is very little complaint."

Discussion by Senators Aldrich, Platt, McCumber, Spooner and Money of Mississippi was on alleged imported goods. The so-called French peas are, to a large extent, put up in this country and are highly colored by chemicals. Cottonseed oil was formerly shipped abroad and reshipped to this country as olive oil. The governments of this and of other countries have largely stopped this. The substitution and the use of foreign labels is now done in this country, and is one of the evils at which the bill is aimed.

Senator Aldrich argued that because of the uncertainty of analysis and the difficulty of the importer securing evidence that the goods he imports are not contrary to the provisions of the bill, the importer in some instances would be liable to unjust prosecution. He declared that the bill was not just, in so far as it would allow this to occur.

Senator McCumber urged that it was right to put the burden of proof on the importer, because he is the first man who handles the goods on whom the government can lay its hand. He is the responsible party.

Senator Spooner urged that since goods pass through the United States Customs Department they should there be examined, and that the certificate of entry should be a guaranty to the importer and from him to the retailer as to the innocence of any one thereafter handling the goods thus guaranteed. He said further that in passing this legislation Congress should industriously see to it that no innocent person could be punished.

The time having come for other business, the discussion ended.

Friday, December 16.

The bill was called up, but was superseded by other business on motion of Senator Lodge of Massachusetts.

The Public Service.

Army Changes.

Memorandum of changes of station and duties of medical officers, U. S. Army, week ending Dec. 17, 1904:

Cox, Walter, and Marrow, Chas. E., asst.-surgeons, advanced to rank of captain Dec. 12, 1904.

Mearns, E. A., surgeon, sick leave of absence further extended thirty days.

Reno, Wm. W., asst.-surgeon, relieved from duty at Louisiana Purchase Exposition, St. Louis, and ordered to Fort Myer, Va., for duty.

Buck, Carroll D., asst.-surgeon, relieved from duty with Philippine scouts, Louisiana Purchase Exposition, St. Louis, and ordered to Fort Des Moines, Iowa, for duty.

Stark, Alexander N., asst.-surgeon, granted two months' leave at expiration of present sick leave of absence.

Ives, Francis J., surgeon, granted three months' leave of absence about Dec. 20, 1904.

Banta, Wm. P., asst.-surgeon, relieved from duty at Fort Sam Houston, Texas, and ordered to duty as surgeon, transport *Sheridan*, during the voyage to Philippine Islands, relieving Asst.-surgeon De Laney; on arrival at Manila to report for assignment to duty.

De Laney, M. A., asst.-surgeon, relieved from duty on transport *Sheridan* and ordered to report in person to the Surgeon General of the Army for duty as assistant to the attending surgeon in Washington, D. C.

Gorgas, Wm. C., asst.-surgeon general, and La Garde, L. A., surgeon, detailed to represent the Medical Department of the Army, at meeting of Pan-American Medical Congress, Panama, Jan. 3-6, 1905.

Ashford, B. K., asst.-surgeon, detailed to represent the Medical Department of the Army at the meeting of the American Public Health Association, Havana, Cuba, Jan. 9-13, 1905.

Ewing, Charles B., surgeon, granted twenty-one days' leave of absence about Jan. 2, 1905.

Maus, Louis M., deputy surgeon general, granted four months' sick leave of absence at expiration of present leave.

Hallwood, James B., contract surgeon, returned to duty at Fort Leavenworth, Kan., December 7 from leave of absence.

Brewer, Isaac W., contract surgeon, granted an extension of fifteen days to his leave of absence.

Hays, Melville A., contract surgeon, granted an extension of one month to his leave of absence.

Boak, S. Davis, dental surgeon, arrived at Fort Myer, Va., Dec. 11 for duty.

Foster, Douglas E., dental surgeon, left Fort Monroe, Va., December 12 for his proper station, Fort Slocum, N. Y.

Wing, Franklin F., dental surgeon, left Fort Des Moines, Iowa December 10 for duty at Fort Washakie, Wyo.

Public Health and Marine-Hospital Service.

List of changes of station and duties of commissioned and noncommisioned officers of the Public Health and Marine-Hospital Service for the seven days ending Dec. 14, 1904:

McIntosh, W. P., surgeon, granted leave of absence for one day, December 10.

Stoner, J. B., surgeon, to proceed to Delaware Breakwater Quarantine and assume temporary charge during absence, on leave, of medical officer in command.

Wertenbaker, C. P., surgeon, detailed to represent the Service at meeting of American Public Health Association at Havana, Cuba, Jan. 9-13, 1905.

Blue, Rupert, P. A. surgeon, granted leave of absence for five days from December 13.

Oakley, J. H., P. A. surgeon, granted leave of absence for one day, December 13.

Wickes, H. W., P. A. surgeon, granted leave of absence for one month from December 23.

Greene, J. B., P. A. surgeon, granted leave of absence for fourteen days from December 19.

Von Ezdorf, R. H., P. A. surgeon, granted leave of absence for six days from December 12.

Anderson, J. F., P. A. surgeon, detailed to represent the Service at meeting of the Laboratory Section of American Public Health Association at Havana, Cuba, Jan. 9-13, 1905.

Behrenburg, L. P. H., asst.-surgeon, granted leave of absence for twenty-one days.

Burkhalter, J. F., asst.-surgeon, granted leave of absence for twelve days from December 24.

Jackson, J. M., Jr., A. A. surgeon, Department letter of Oct. 10, 1904, granting leave of absence for thirty days from October 26, amended to read thirty days from November 26.

Kestley, H. W., A. A. surgeon, granted leave of absence for eighteen days from December 10.

Primrose, R. S., A. A. surgeon, granted leave of absence for eighteen days from December 5.

Hanrath, F. R., pharmacist, relieved from temporary duty at Cleveland, Ohio.

RESIGNATION.

Harris, B. Y., A. A. surgeon, resigned, to take effect Dec. 15, 1904.

Health Reports.

The following cases of smallpox, yellow fever, cholera and plague have been reported to the Surgeon General, Public Health and Marine-Hospital Service, during the week ended Dec. 16, 1904:

SMALLPOX—UNITED STATES.

Illinois: Dec. 3-10, Chicago, 7 cases, 1 death; Danville, 1 case.
Kentucky: Louisville, Dec. 1-8, 3 cases.
Louisiana: New Orleans, Dec. 3-10, 4 cases, 2 imported.
Maine: Nov. 1-30, Cape Elizabeth, 1 case; Eagle Lake Plantation, 1 case; New Sweden, 1 case; St. Agatha, 1 case; St. Frances Plantation, 1 case.
Michigan: At 75 places, Nov. 26 Dec. 3, present.
Missouri: St. Louis, Dec. 3-10, 15 cases, 2 deaths.
Nebraska: Omaha, Dec. 3-10 1 case.
Ohio: Cincinnati, Dec. 2-9, 3 cases; Toledo, Nov. 26-Dec. 10, 3 cases.
Pennsylvania: Dec. 3-10, Johnstown, 3 cases; Philadelphia, 1 case.
South Carolina: Greenville, Nov. 26-Dec. 3, 2 cases.
Tennessee: Nashville, Dec. 3-10, 5 cases.
Wisconsin: Milwaukee, Dec. 3-10, 18 cases.

SMALLPOX—INSULAR.

Philippine Islands: Oct. 29, Marinduque Province, epidemic; Siguijor Province, epidemic; Surigao Province, epidemic.

SMALLPOX—FOREIGN.

Austria: Vienna, Nov. 19-26, 1 death.
Brazil: Bahia, Oct. 29-Nov. 12, 36 cases, 3 deaths; Para, Nov. 15, epidemic.
Denmark: Copenhagen, Nov. 5-12, 1 case.
France: Nov. 19-26, Lyon, 1 case; Paris, 11 cases.
Germany: Munich, Nov. 19-26, 2 cases, 2 deaths.
Great Britain: Glasgow, Nov. 25-Dec. 2, 1 case; Nov. 19-26, Manchester, 1 case; Newcastle-on-Tyne, 4 cases; South Shields, 1 death.
India: Bombay, Nov. 8-15, 7 deaths.
Italy: Palermo, Nov. 12-26, 36 cases, 9 deaths.
Mexico: City of Mexico, Oct. 1-Nov. 19, 15 cases, 5 deaths.
Russia: Odessa, Nov. 19-26, 1 case; St. Petersburg, Nov. 12-26, 8 cases, 1 death; Warsaw, Oct. 22-29, 9 deaths.
Spain: Barcelona, Nov. 20-30, 7 deaths.

YELLOW FEVER.

Mexico: Nov. 20-Dec. 3, Marida, 2 cases; Texistepec, 21 cases, 2 deaths.

CHOLERA.

India: Calcutta, Oct. 29-Nov. 5, 11 deaths.
Persia: Nov. 26, Gilan Province, epidemic; Mazonderom Province, epidemic; October, Resht, 10 cases daily; Tabriz, 400 cases daily.
Russia: Nov. 4-8, Baku, 6 cases; Balachany, 5 cases; Erivan, 132 cases, 62 deaths; Samara, Oct. 17-24, 65 cases, 14 deaths; Tiflis, Nov. 7, 1 case.
Turkey in Asia: Mesopotamia, Oct. 22-29, 96 cases, 89 deaths.

PLAGUE—INSULAR.

Hawaii: Honolulu, Dec. 10, 1 death.

PLAGUE—FOREIGN.

Arabia: Aden, Nov. 4, 1 death.
Argentina: Saita, Nov. 9-15, epidemic.
Brazil: Bahia, Nov. 5-12, 8 deaths.
Egypt: Nov. 5-12, Achmun District, 1 case, 1 death; Tukh District, 4 cases, 1 death.
India: Bombay, Nov. 8-15, 75 deaths; Calcutta, Oct. 29-Nov. 5, 9 deaths; Karachi, Oct. 31-Nov. 6, 11 cases, 9 deaths.

Society Proceedings.

COMING MEETINGS.

AMERICAN MEDICAL ASSOCIATION, Portland, Ore., July 11-14, 1905.
Western Surgical and Gynecological Association, Milwaukee, Wis., December 28 29.
Pan-American Medical Congress, Panama, Jan. 2-6, 1905.
American Public Health Association, Havana, Cuba, Jan. 9-13, 1905.

SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION.

Seventeenth Annual Meeting, Held at Birmingham, Ala., Dec. 13-15, 1904.

The Second Vice-President, Dr. J. Shelton Horsley of Richmond, Va., in the chair.

Addresses of Welcome were made by Mayor Drennan and Dr. L. G. Woodson, and were responded to by Dr. W. P. Nicolson of Atlanta, Ga.

Officers elected: President, Dr. Lewis C. Bosher, Richmond, Va.; vice-presidents, Drs. John D. S. Davis, Birmingham, Ala., and I. S. Stone, Washington, D. C.; secretary, Dr. W. D. Haggard, Nashville, Tenn., re-elected; treasurer, Dr. Charles M. Rosser, Dallas, Texas, re-elected.

Louisville, Ky., was selected as the place for the next annual meeting, in December, 1905.

Intestinal Obstruction.

DR. DYER F. TALLEY, Birmingham, Ala., pointed out two difficulties in the way of early operation for intestinal obstruction: 1. It is hard to make a positive diagnosis in the first 24 hours. Indeed, in some cases it is impossible to do so, unless an exploratory laparotomy is made. 2. There is a tendency on the part of his patient and his friends, and also on the part of the physician, to wait until to-morrow and see what purgatives and enemata will accomplish. Dr. Talley reported 8 cases of intestinal obstruction that have come under his care during the last 15 months. One case showed that a laparotomy can be done without anesthesia, and many cases that are seen late and are too weak for an anesthetic may be operated on and relieved without a general anesthetic. The results of operation in the 8 cases were 5 recoveries and 3 deaths.

DISCUSSION.

DR. GUY LEROY HUNNER, Baltimore, said that he would rather err on the side of operating occasionally unnecessarily than to commit the error of not interfering and be too late. He cited cases in point.

DR. W. P. CARR stated that the more he sees of cases of intestinal obstruction, the more he is convinced that whenever there is a strong suspicion of it an exploratory operation should be made. There are so many cases that have little or no symptoms for quite a while, and others that have considerable fecal movements in the lower bowel after obstruction has taken place, that one is apt to be misled. He has been misled a number of times.

DR. J. GARLAND SHERRILL, Louisville, Ky., advocates early operation in these cases. Whenever a patient has intra-abdominal pain, which is not properly relieved, an exploration should be made. Whenever a patient has a severe pain in the abdomen that ceases suddenly, it is likely to be the result of gangrene of the gut, and for that reason such a case demands very prompt operation. Many of these patients can be saved by opening the abdomen at once, even in the presence of shock, and in this way inflammation of the peritoneum may be avoided.

DR. CHAS. L. BONIFIELD, Cincinnati, recommends changing to ether when patients cannot stand chloroform, particularly in children.

DR. W. O. ROBERTS, Louisville, Ky., narrated the case of a child, 9 months old, on which he had operated. The child had been treated for dysentery. When he saw the patient there was a considerable amount of distention of the abdomen, great straining on the part of the child, and bloody mucus passed by the bowel. He introduced his finger into the rectum and found an intussusception. The intussusception was within two inches of the anus. Laparotomy was performed, and he found that the intussusception began at the ileocecal opening, and extended to within two inches of the anus. It was relieved; but the child died in the course of 12 hours from shock. He thinks it important in all cases of intestinal obstruction to examine the rectum carefully.

DR. WM. E. PARKER, Hot Springs, Ark., said that the general practitioner should be impressed with the importance of early diagnosis in these cases, and if there is any question, to call in a general surgeon or some one who has had experience in this class of cases. After the diagnosis is made, one should get into and out of the abdomen as quickly as is consistent with good work.

DR. W. P. NICOLSON, Atlanta, Ga., said that we should always bear in mind that the location of pain in the abdomen

in many cases bears practically no relation to the site of the lesion.

DR. SAMUEL J. MIXTER said that a patient who has had intestinal obstruction for days, and is in a very critical condition, can be saved, if too much is not attempted. Many of these patients die because surgeons attempt too much. In a case of gangrene following intussusception, if a simple opening is made in the distended loop of bowel, a tube tied in, and the intestine drained, a later operation can be done, and the patient probably be saved, whereas if one attempts to do a resection or a serious operation at the time, the patient will almost surely die.

DR. A. PALMER DUDLEY stated that the surgeon is at a great disadvantage when he is called to a patient to whom morphin has been administered for pain, because it masks the symptoms. Peristalsis is arrested, and the obstruction goes on more rapidly. He has not given a dose of morphin in 15 years to any patient on whom he has performed an abdominal section.

A Review of One Thousand Operations for Gallstone Disease.

This joint paper by DRS. WILLIAM J. MAYO and CHARLES H. MAYO, Rochester,, Minn., was read by the latter. In 1,000 operations for gallstone disease there were 50 deaths—5 per cent.—counting as a death every patient operated on who died in the hospital without regard to cause of death or length of time thereafter; 960 for benign disease, with 4.2 per cent. mortality. More than one procedure through a single incision, only the major was counted, therefore 101 cholecystostomies, and 44 cholecystectomies in connection with common duct operations were not included. Of 673 cases operated on by cholecystostomy there was a mortality of 2.4 per cent. This group included most of the acute infections. In no case did the stones re-form in the gall bladder. This is the operation of choice in the average uncomplicated case, and especially if there is or has been cholangitis.

Of cholecystectomy, there were 186 operations, with a mortality of 4.3 per cent. This operation was employed for special indications, such as cystic duct obstruction, thick-walled gall bladders suspicious of malignant disease, and cholecystitis without calculi. There were 137 operations for stone in the common duct, with a mortality of 11 per cent., 7 per cent. from the operation, and 4 per cent from secondary complications after more than three weeks. Of the cases operated on during the quiescent period, with little jaundice and slight infection, all recovered. There were 4 cases with extreme icterus from obstruction, who had subcutaneous hemorrhages at the time of operation (purpura). All of these died; 4 cases of complete biliary obstruction in which the common and hepatic ducts were filled with clear cystic fluid and no bile; all died. Including malignant disease, 14.6 per cent. of the total were of the common duct; 40 cases of malignant disease, with 22.5 per cent mortality; 2 cases with cancer of the gall bladder now alive and well, more than two years after operation; 2 additional favorable cases of more recent date. Of the remaining malignant cases, a few received marked palliation, but the majority were but little benefited.

Enterostomy.

DR. J. W. LONG, Greensboro, N. C., reported 8 cases of enterostomy occurring in 22 years of practice, with 5 recoveries, or 62.5 per cent. He drew the following conclusions:

1. Enterostomy is a life-saving measure and never an operation of choice. 2. It is not indicated where a more ideal surgical procedure is feasible. 3. In the hands of an experienced, carefully-trained, competent surgeon, capable of dealing with grave emergencies, enterostomy need rarely be resorted to, but the better the surgeon the more quickly he will adopt any measure which will rescue his patient. 4. Every abdominal surgeon must, according to the abundance of his material, find cases in which only enterostomy can with propriety be done. 5. When an enterostomy is indicated, to hesitate is to lose the patient; to operate promptly, dextrously and with celerity means to tide the patient over the imminent peril and spare him for future consideration.

DISCUSSION.

DR. JAMES A. GOGGANS, Alexander City, Ala., said that drainage of the distended intestines is very important. He makes it a rule, if possible, when he does a laparotomy for any trouble whatever, to drain the intestine in order to let it regain its elacticity and to move the fecal current along as it should go.

DR. J. GARLAND SHERRILL believes that enterostomy has a place in surgery in those cases in which complete surgery can not be done; but whenever a surgeon sends a patient away from the operating table with an open intestine, he subjects the profession and himself to criticism from the laymen who do not understand the condition. Therefore, he would lay it down as a rule that no enterostomy should be done in any case where it is possible to do complete surgery, and instead of widening the field for enterostomy, surgeons should strive to contract it.

DR. I. S. STONE, Washington, D. C., said that Dr. Long must have got hold of a number of very difficult and delayed cases for operation. He thinks his idea is that rather than let a patient die from obstruction, he would catch up a loop of bowel and make an artificial anus. This is the old-fashioned way of doing enterostomy, and Dr. Long obtained as good a mortality as most surgeons would have gotten under the same circumstances.

DR. LONG said that he has, unfortunately, had quite a number of cases in which it seemed proper to do enterostomy. These 8 cases were spread over a period of more than 22 years' practice. He doubts if any surgeon has a better percentage of recoveries in cases of acute intestinal obstruction by any method than that which he had reported, namely, 62.5 per cent.

(To be Continued.)

CHICAGO MEDICAL SOCIETY.

Regular Meeting, held Nov. 16, 1904.

The President, Dr. John B. Murphy, in the Chair.

The Advantage of Muscle-Splitting and Muscle-Retraction Incisions in the Prevention of Ventral Hernia.

DR. MARTIN B. TINKER, Ithaca, N. Y., read a paper (by invitation) on this subject, saying that the very considerable number of ventral hernias, following clean, uncomplicated abdominal operations, should furnish ground for reflection as to the necessity for their occurrence. The number of these cases which have come to him during the past year has formed almost 4 per cent. of his total number of cases. He believes that the patients seldom return for the cure of their hernia to the surgeon who performed the original operation causing the hernia. The state of many of these patients, with their constant discomfort from wearing some form of abdominal support, with pain from adhesions about the hernial opening, and with the not infrequent occurrence of symptoms of strangulation, often makes their condition but little preferable to that for which the original operation was undertaken.

To avoid the disadvantages of the rectus incision, especially the paralyzing of the median side of the muscle, and in opening the abdomen for pelvic operations of any kind, Dr. Tinker usually employs the Pfannenstiel supra-symphysis cross incision, which gives free access to the pelvis and organs near the median line of the body, although if freer exposure is desirable, the Lennander rectus retraction incision is preferable. The Pfannenstiel incision has the possible additional advantage of placing the scar below the pubic hair line, where it is not noticeable. It will be found very satisfactory for myomectomy; operations on the tubes or ovaries; advancement of the round ligaments for backward displacement, or other operations near the median line of the lower part of the abdomen. For abdominal hysterectomy the Lennander incision is better, and also for exploration of the right iliac fossa, where involvement of the pelvic organs is suspected. Where simple appendectomy is to be performed, the McBurney muscle-splitting incision is prefer-

able, but when appendectomy is combined with work in the pelvis, the Lennander incision is the better. Operations in the upper abdomen are less likely to be followed by postoperative hernia, but the muscle-splitting incisions in the treatment of diseases of the gall passages afford far greater security against the occurrence of ventral hernia.

Healing by first intention is of great importance in the prevention of ventral hernia; the careful arrest of hemorrhage, to prevent accumulation of blood in the wound, not only lessens the danger of infection, but favors firm healing. The prevention of strain after operation, by distention, postoperative nausea and vomiting is also very important, as is also the prevention of strain on the wound by the patient exerting himself too early. The accumulation of intestinal gases can be greatly lessened, if not entirely prevented, in most cases by thoroughly emptying the intestinal tract before operation, and by careful attention to the bowels afterward.

The possibility of getting the patient out of bed at an early date following operation with a feeling of absolute security from hernia, and without the necessity for wearing a binder, is a great satisfaction and sufficient reward for the extra pains and few additional minutes of time required to open and close the abdomen by any one of these methods.

DISCUSSION.

DR. L. L. MCARTHUR stated that the lines of cleavage described by Kocher bear a relationship to three factors: to those lines in which the least tension would occur; to those in which the least destruction of muscular fiber or actual paralleling of muscular fiber will occur; and, finally, to those incisions in which the innervation of the muscles involved shall not be disturbed. He said that he was very much surprised that in any man's statistics, in uncomplicated cases, where drainage has not been necessary, that so large a per cent. as one in five, or 20 per cent. of hernias, should occur. It may be explicable on the basis that patients do not return to the surgeon who has been the cause of the hernia. He thinks a very decided improvement is an incision at the edge of the rectus, where occasionally one finds it necessary to go into the pelvis for complications in operations which are associated with appendiceal work, as ovarian tumor, suppurative tubes, twisted ovarian pedicle, etc.

DR. ARTHUR DEAN BEVAN agreed with Dr. Tinker as to the importance of planning incisions so as to reduce the danger of resulting postoperative hernia to a minimum. First, plan the incision so as to give free and sufficient exposure to do the operation. Second, plan the incision so as to give the least possible danger of a resulting hernia. In opening the abdomen to remove a large fibroid of the uterus, one could not employ the Pfannenstiel incision, and, in opening the abdomen to remove a large spleen, one can not employ the muscle-splitting incision. In opening the abdomen posteriorly, to remove a large tumor of the kidney, the muscle-splitting incision is out of the question. Furthermore, in opening the abdomen to operate on the common duct, the muscle-splitting incision should not be considered. An incision can be planned for the exposure of the kidney, which is parallel with the nerves of the region of the abdominal wall, yet not a muscle-splitting incision, and in which there will be very little danger of hernia. An oblique incision, parallel with the costal arch in the upper abdomen, which divides nerves, muscle fibers, or fibrous tissue transversely, is not nearly so apt to be followed by hernia as a muscle-splitting incision in the lower portion of the abdominal wall. It is rare to have a hernia following an incision parallel with the costal arch for gall-bladder work. He does not think, however, that the muscle-splitting operation should be employed where other factors are more weighty. An incision in the linea alba is a very safe and useful one, and he employs it quite extensively. He thinks that the statistics of 7 per cent., or 20 per cent., are altogether too great. Why should there be a hernia in a median incision of from three to six inches in length which heals by primary intention, and where the patient has been allowed to remain in the recumbent position until wound healing is complete? German surgeons have more hernias following their operations than American surgeons. Statistics of operations from the Heidelberg Clinic, by Czerny, which have been extensively reported in the *Beiträge zur Klinische Chirurgie* for the last four or five years, show the proportion of hernias to be from 20 to 25 per cent. in suppurative cases. This percentage would be considered large in America. The length of the incision is of comparatively small importance as compared with primary wound healing. The recumbent position should be maintained until wound healing is complete. He does not approve of a patient getting up on the second day, after a muscle-splitting incision or not.

DR. E. WYLLYS ANDREWS said he had supposed that the Pfannenstiel incision is a skin incision only. He has only used it a few times. He goes one-half or three-quarters of an inch out from the median line and secures masular wall for the incision. He attaches a good deal of importance to the imbrication idea, even in ordinary celiotomy.

DR. A. J. OCHSNER said that whoever has witnessed the German clinics knows that several things are done which must result in bad unions. First, the incision usually is made very long; second, the tissues are handled roughly; third, the stitches are applied with the least possible amount of care and accuracy; fourth, they are tied so tightly that they tend to cause pressure necrosis. All those factors are bound to cause ventral hernia. He said that there is not .25 per cent. of ventral hernia possible provided the conditions he mentioned are carried out. He has followed many hundreds of his cases, and in those in which there was no drainage nor suppuration there was no ventral hernia. There can not be a ventral hernia if the different layers are accurately and properly approximated. He places a silkworm-gut suture down through the transversalis fascia as an emergency suture, so that if the patient should sneeze severely at the time when the catgut has become softened, there will be a safety suture on the outside to hold it. He sutures the peritoneum and transversalis fascia together; he passes a second catgut suture through the muscle, and a third catgut suture through the aponeurosis of the external and internal oblique, and ties the silkworm-gut suture sufficiently loosely to guard against pressure necrosis. Furthermore, he applies, for emergency's sake again, broad adhesive strips, so that if the patient should strain, vomit severely, or sneeze, the soft tissues will not be torn. He takes the additional precaution of always emptying the bowels thoroughly before operation, and of keeping them moved always so as not to cause a great amount of intraabdominal pressure.

DR. E. C. DUDLEY said that the probabilities are that the most practical single incision for exploration is one that is made near the median line. He makes his so-called median incision through the right rectus muscle, parallel with the fibers of the muscle, somewhere near the inner margin of the muscle. This is done in order to avoid ventral hernia or to get a more accurate closure. For many years he has abandoned the through-and-through suture and has used chromicized catgut, suturing layer by layer, first the peritoneum, the posterior fascia, the anterior fascia over the rectus muscle, and then, if there is a great deal of subcutaneous structure, sutures through that and then inserts a buried suture for the skin.

DR. WILLIAM CUTHBERTSON stated that Pfannenstiel recognizes the limitations of his own incision, which is applicable to the removal of large tumors or of appendices complicated by some pelvic difficulty where there may be a short mesoappendix or cecum. He agreed with Dr. Bevan in reference to the after-treatment. Experiments which he has made on dogs have directed his attention particularly to the fact that, after having opened the abdomen of a dog, forty-eight hours later it was quite easy to open the wound by simply pressing the finger through the line of incision. In from four to five days it was hard to open the skin incision with the finger, and it usually required the handle of a scalpel,

a Kocher dissector, or a moderately sharp instrument to reopen the skin incision. After getting through the skin, it is an easy matter, with the finger, to separate the abdominal muscles and to re-enter the abdominal cavity. In abdominal operations we should not be in such a great hurry to get patients out of bed unless they are old and feeble, but to give them a longer time to let wound healing be complete. Furthermore, to have thorough hemostasis before closing the abdominal wound, and not leave a blood clot between the surfaces of the wound to become organized.

DR. CARL BECK stated that German surgeons publish a larger number of statistics than do Americans, because they keep more exact clinical records. If patients in America have hernia they do not return to the clinics as do the patients in Germany, but they go to other surgeons. The percentage of hernia, therefore, following operations in America is much greater than would appear from what has been said. Secondary union is due in many instances to poor hemostasis in closing the abdomen. He has removed large tumors through a small transverse incision because one can stretch the incision. The muscles are not split, but simply the fascia. The disadvantage of this method is that we open large surfaces, and if exact hemostasis is not secured secondary union is invited, which can be avoided in the other incision by putting in a number of sutures of catgut or of silk. He avoids suppuration by putting in drainage in the septic cases clear down to the surfaces that had been divided. With the addition of tubal drainage, one can employ this incision satisfactorily and can avoid hernia.

DR. ALBERT GOLDSPOHN said that his belief is that the percentage of hernia is far less than that mentioned, and he is inclined to regard it as almost a closed chapter. The cardinal principles of closure of wounds must be carried out, or there will be a hernia. He described a technic similar to that of Dr. Ochsner, except that he does not find it necessary to open the sheaths of both recti, but severs one rectus muscle and opens one sheath only, not splitting the muscle, but separating it from the linea alba, and then uniting it with a few through-and-through sutures to guard against the accumulation of serum or of blood between the layers of the wound.

DR. TINKER said that he would not have any one believe that he advocates these incisions for all kinds of surgical work. No one recognizes their limitations any more clearly than he does. It is not his custom to allow his patients to get up in less time than a week, and usually not until ten days after operation. Healing is not likely to be complete until that time; but he does feel perfect confidence in allowing a patient with one of these incisions to get up at the end of two weeks, at the latest, without the use of any binder, and he has yet to see any evil results following it.

Travel Notes.

GRANT MEDICAL COLLEGE AND THE HOSPITALS OF BOMBAY.

NICHOLAS SENN, M.D.
CHICAGO.

(*Concluded from Page 1895.*)

PREVALENT DISEASES.

Tropical abscesses are very common in Bombay. They affect most frequently the thighs and gluteal regions. They do not give rise to serious constitutional symptoms and the local symptoms are likewise mild. Speedy healing after incision and drainage may confidently be expected. Tetanus is most frequently met with during the two hottest months of the year, April and May. The serum treatment has not had an extensive trial, and the mortality is large, more than 50 per cent. In one case an intracerebral injection of the antitetanic serum was made. The patient died. On postmortem the serum was found at the site of injection, no absorption having taken place. In the treatment of tetanus, hydrate of chloral and potasssic bromid in very large doses are relied on. Hydrophobia is quite prevalent in India. Bombay sent last year 65 cases of suspected dog bite to the Pasteur Institute at Simla. Elephantiasis of the scrotum is much more common among the Parsees than among the Hindus. Patients thus affected now seek surgical relief before the weight of the swelling becomes a source of great inconvenience, as the former objections to the operation have beeen overcome by the better operative results. Many cases of hydrocele in young men develop during the hottest months of the year. About from fifty to sixty cases of stone in the bladder apply for relief every year.

Hernia in women is very rarely met with in India, and the surgeons believe that this is due to their spare bodies and the vigorous exercise incident to the hard work the common women are required to undergo. Several cases of Madura foot and ainhum find their way into the hospital every year. Actinomycosis and blastomycosis are not known here. In the coolies gonorrhea pursues a very mild course. No local treatment is used. Under internal use of an alkaline mixture, the disease subsides in the course of ten days.

HOMELESS LEPER ASYLUM, MATUNGA, BOMBAY.

One of the most creditable and beneficial of the hundreds of charity institutions of Bombay is the Homeless Leper Asylum in the suburb Matunga. It is the largest leper asylum in India, and at present it is the home of 370 lepers. The inmates are well cared for, and instead of living the lives of outcasts in misery, beggary and much suffering, are well housed, kindly treated, and their discomforts and pains alleviated to a remarkable degree. Segregation has never been carried into effect, and there are now about 150 vagrant lepers roaming the streets of Bombay. Mr. H. A. Acworth, I.C.S., C.I.E., municipal commissioner for the city of Bombay from 1890 to 1895, is the founder of this model institution, as it was through his influence that the necessary funds were obtained. Rich merchants and native princes responded to his appeal and made liberal contributions. The many tile-roofed, one-story brick pavilions are situated in grounds embracing 11½ acres of fertile land, advantageously located, enclosed and unenclosed; municipal and leased from the government at a nominal rent. On the morning of Nov. 7, 1890, about fifty vagrant lepers were collected by the health department and the police at various centers and, after medical examination, were sent to the asylum under police escort and, after thorough cleansing and change of clothes, were entered as the first installment of patients of the leper home. The poor lepers have since learned from experience and observation the full extent of the benign and humane intentions of the asylum and now enter it voluntarily in increasing numbers, happy in the thought that by doing so their short lives will be made more endurable by the care and kind treatment which awaits them there. The grounds are beautifully laid out and ornamented with trees and flowers. The garden of roses is one of the finest in Bombay. In the grounds there is a school for children, a Roman Catholic Church, a Hindu temple and Mohammedan mosque. All the Hindus that die in the asylum are cremated by the inmates, according to the Hindu custom. After appropriate ceremony, in a place set apart at the extreme east corner of the gronuds, the rites incidental to cremation are performed by the patients themselves, and one khandi (28 maunds) of firewood is allowed for each corpse, at a cost of 8½ rupees ($2.72). A bier and pall are provided for the Mohammedans and the corpses are removed to the cemetery at Marine Lines by bearers, who are sent from the city and are paid at the rate of about 7 rupees ($2.24) per corpse, to defray the charges of conveyance and all incidental expenses. A Mohammedan priest, who has been the subject of the anesthetic form of leprosy for 11 years and an inmate of the asylum for 5 years, attends to the spiritual needs of those inmates of the asylum who are of the same religious belief and receives a small salary for his services. A Roman Catholic priest from Bombay visits the

asylum regularly every week. The Roman Catholic dead are removed from the asylum for burial at the expense of their fund, all arrangements being made for the purpose by the Rev. Father Peters, S.J. The Protestants have a pauper funeral at the expense of the asylum funds. The Protestant missionaries do not seem to be aware of the existence of the Homeless Leper Asylum or its contingent of protestant inmates. One of the most interesting features of the asylum is the small sewage farm connected with it, and which is fertilized with sterilized sewage. The sterilization is effected by collecting all the sewage and passing it through a series of open tanks. This method of sterilization and utilization of sewage has been found entirely satisfactory and has been a source of no inconsiderable income to the asylum. The report of the asylum shows about the following proportion of the various religious beliefs of the inmates:

	Percentage.
Hindus (Mahrattas)	66.43
Mohammedans	9.32
Christians	10.61
Hindus (low caste)	13.41
Other castes	.23

There are about twice as many men as women, and the children constitute about 2.51 per cent. of all the inmates. One of the touching instances among the many I saw in visiting this great institution was a group of children, numbering about 15, who had just left the schoolroom and had congregated near the gate of entrance to the grounds to bid the visitors good-bye. They ranged in their ages from 6 to 12 years and were all lepers.

The anesthetic and tubercular forms of the disease are about equally represented, and the mixed form affects about 12.63 per cent. of all cases. The dispensary is well supplied with medicines, the hospital is scrupulously clean and supplied with comfortable cots. A physician visits the asylum every day, and his assistant resides in the institution, always ready to render necessary medical and surgical aid.

THE PLAGUE RESEARCH LABORATORY OF THE GOVERNMENT OF INDIA, PAREL, BOMBAY.

This institution owes its origin to Mr. W. M. Haffkine, C.I.E., a Russian scientist, who has rendered India such signal service since 1893, first by his prophylactic treatment of cholera by serum inoculations and later by his discovery of a serum against the plague. I was very anxious to meet Mr. Haffkine, but unfortunately he was absent on a visit to Europe, but I met in his place Lieut. Col. W. B. Bannerman, M.D., B.S.C., I.M.S., who temporarily filled his place as director-in-chief of the laboratory and who holds the permanent position as superintendent. The former residence of the governor of Bombay, at Parel, a beautiful suburb, has been converted into a laboratory and the former ballroom is now the place where the anti-plague serum is brewed, and halls and bedrooms where fashion reigned are now occupied by dozens of cages containing animals for experimental use.

According to a paper presented by Lieut. Col. Bannerman to the Royal Society of Edinburgh in 1902, the serum treatment, in the prevention of the bubonic plague, devised by Haffkine, is reliable and specific in its results. The immunity thus obtained remains throughout an epidemic and has been known to last two years; its exact maximum limits, however, remain undetermined. The serum is prepared on a very large scale and is sent wherever needed free of expense through government channels. Wide bottles with long, narrow necks, holding about a liter, are filled with bouillon and the culture medium is inoculated with the plague bacillus. A characteristic growth in the form of innumerable hanging stalactite-like threads form. At the end of two months the culture is sterilized by boiling and is kept ready for use in another room. The culture and serum rooms contain hundreds of these bottles, protected against contamination by a cotton plug with ends burnt off. The prophylactic treatment consists in making a single hypodermatic injection of from 4 to 5 cc of the sterilized culture under strictest aseptic precautions. All subjects thus treated have escaped the disease, even in badly infected districts. The experience with this serum has reached enormous dimensions and its absolute reliability can no longer be questioned. Accidents have happened, but they could always be traced not to the serum *per se*, but to its improper administration. Bannerman concludes his paper as follows: "The final conclusion, then, appears to be that in this discovery of Haffkine's we have within our reach a means of controlling an epidemic of plague and converting it into a manifestation of sporadic cases only, easily controlled and exciting little alarm."

Haffkine receives a salary of 2,000 rupees ($640) a month, an amount not any too large for the man through whose scientific researches two of the most dreadful epidemic diseases of India are on the way to extinction.

BOMBAY BUBONIC PLAGUE HOSPITAL.

During my tour through the tropics I made frequent inquiries at the different ports for the purpose of finding an opportunity to see cases of bubonic plague. All the ports were free from this disease until I came to Bombay. For four years Bombay has been the center of an epidemic of this disease and in consequence a dreaded port for navigators and ship owners. The disease has passed its climax and is gradually being gotten under control. The plague hospital is located outside of the city limits and consists of a row of one-story brick buildings which serve as wards.

During the height of the epidemic as many as 30 patients a day were admitted from the city and nearby villages. The mortality has been very great. Many die from the general sepsis, others from pulmonary and other complications. After a period of incubation of from five to seven days, the disease is ushered in abruptly with very high temperature and other symptoms indicative of a profound constitutional disturbance. The inguinal glands are most frequently involved, next the glands of the axillary spaces. The cervical glands are very seldom affected. Enucleation of the suppurating glands has been tried, but was abandoned, as it was found that after such attempts to cut short the local infection, the general infection usually became aggravated.

The local treatment resorted to now consists in the use of poultices until fluctuation is distinct when the abscesses are incised and the antiseptic gauze dressings take the place of the poultices. The general treatment is supporting and stimulating. Large abscesses frequently develop remotely from the infected glandular regions. At the time of my visit about 25 patients remained in all stages of the disease. Some of them were in the height of the primary fever, more of them were slowly recovering from extensive glandular abscesses in the inguinal regions. I only saw two patients in which the axillary glands were also involved. In all the inguinal abscesses that had been incised the enlarged glands partially isolated from the surrounding tissues presented a grayish appearance with no indications of any attempt at repair.

Some of these survivors had been in the hospital for two or more months. One of the convalescents, who had recovered sufficient strength to walk about, had lost his speech, the result of cerebral complications which set in during the acute stage of the disease. All convalescents were emaciated to an extreme degree. Three heroic trained female nurses take care of the sick, aided by male and female helpers. One of these nurses has been on constant duty since the epidemic commenced, more than four years ago, and notwithstanding the arduous and trying duties that she has so faithfully performed her general health has not suffered; an interesting proof of woman's endurance under circumstances that would be a severe test on the strength of the strongest man.

A COBRA DEN.

My visit to the research laboratory was made late in the day. It was during the short twilight and in the absence of electric or gas lighting we had to find our way through the dark halls and rooms of the former palace of the governors of Bombay with the aid of the light of a lantern. Lieut.-Col. Bannerman led the way. We passed through halls and rooms on the first floor between rows of cages containing rabbits, guinea pigs, rats and mice, and the little creatures, scared

by the appearance of the late visitors, were roused from their dormant condition and displayed an activity begotten by fear. We finally came to the door of a large room in which darkness was complete. The moment we entered a fearful hissing from every part of the room greeted us, mingled with short raps resembling the tapping sound made by striking a wire screen with a small hammer. I was in a cobra den, in the midst of 150 of these terrible reptiles, imprisoned in cages, it is true, but wide awake and roused to anger by our untimely intrusion. They were assisted in their hissing and striking against the wire screen which guarded the open end of their cages by 50 other snakes still more venomous, Russell's viper. (*Daboia russellii.*) Through the meshes of the wire screen shot the forked tongues of 200 of the most venomous reptiles known. Add to the hissing and striking noises the 200 forked red tongues, 400 staring, deceptive and treacherous eyes, the snaky odor that pervaded the atmosphere of their dungeon and you will have a good idea of what is meant by a cobra den. The cobra (*Naia tripudians*) is about four feet in length, and when angered the flat head and neck expand into wing-like projections on each side, increasing their width to the size of the palm of the hand. The color is almost black, the tail tapering into a sharp point. The viper is of about the same size, but has circular stripes. I know of no more ugly sight than a cobra in striking attitude. Every snake in the room was in a fighting mood, hissing and striking the wire screen with a thud-like noise; at short intervals red forked tongues shot out through the meshes of the wire screen on all sides, and the situation was made more horrible by the revolting snake smell issuing from so many cages.

The snake, the most despised animal in creation, is an object of fear and horror to all who are familiar with his damnable record in the Garden of Eden and with the curses imposed on him by the Almighty. I did not know but some of these terrible beasts might be at liberty in that large imperfectly lighted room, and only breathed easy again after we had left the room and the door was shut and securely locked.

It was prearranged that I should become more familiar with the dangerous part of the anatomy of cobra and viper. We ascended the broad staircase leading to the second floor and entered the office of the superintendent of the laboratory, Lieut.-Col. Bannerman, who on this occasion extended so many courtesies to me. He sent for the "snakeman," and in a very short time three coolies made their appearance with so many snakes in their cages, one cobra and two vipers. I was to witness the "milking" of their poison sacs. I begged to be informed beforehand how this was to be done in order that I might make my own plans of conduct for safety during the ordeal. The superintendent smiled and said: "You must see for yourself." The snakes were in an offensive attitude, as they had undergone this procedure repeatedly and had learned by experience to dread it. I could see no opening in the boxes through which the snakes could be made *hors de combat*.

The "snakeman" was a very slender coolie, with very long, thin arms and legs, and fingers like the claws of a monkey.

The cobra, with its raised, expanded head in striking position came first. The man held a smooth stick the size of an ordinary cane and about two feet in length in his left hand. Suddenly, standing behind the box with the wire screen directed toward him, he threw open the opposite side with a lightning jerk and out shot the angry monster, and in undulating rapid movements advanced toward me. A quick retreat on my part behind the table increased the distance between us. Before the snake had advanced three feet the "snakeman" grasped the end of his tail with a lightning movement of the right hand, lifted it high in the air, and with the stick passed from tail to neck prevented a recoil, lowered it to the floor. With the stick, the neck was pressed against the floor, the right hand, quickly substituted for the stick, grasped the neck firmly and with the left hand made traction on the tail, thus straightening out the squirming body. A small goblet, covered drum-like with American adhesive plaster with adhesive side directed outward, was placed near enough for the snake to strike it. The fangs penetrated the plaster and by pressure against the poison sacs about half a dram of viscid opaque fluid escaped into the sterilized goblet. The cobra was returned into the cage with the same expertness as characterized its liberation. The whole procedure did not occupy more than ten minutes. Snakes refuse all food during confinement, hence they are fed each time the poison is removed, which is done every 10 days. The long tip of a small funnel is inserted into the throat and about two ounces of a mixture of egg and milk is poured into the funnel, which enters the alimentary canal without meeting any obstruction. The vipers were then handled in a similar manner, only that in their case the poison was received direct from the fangs into an open goblet by opening the mouth widely with a pair of forceps and steadying the fangs with a thread passed around them and on which traction was made by an assistant, who at the same time held the goblet. I could see distinctly the drops of poison escape through the tiny opening at the very tip of the enormous fangs, which looked like fish hooks without a barb.

The poison is desiccated in the laboratory under aseptic precautions, and is later sent to another laboratory, where it is used in the preparation of Calmette's antivenene. There is no lack of an adequate supply of cobras and vipers for this laboratory as they are bought from the natives at from a few annas to one rupee each.

CALMETTE'S ANTIVENENE.

Calmette of Lille is the discoverer of antivenene. Captain Lamb, I.M.S.,[1] who has made a very careful study of the therapeutic value of this agent in the treatment of bites of poisonous snakes has come to the conclusion that antivenene prepared from the venom of one genus of snakes is only curative in the treatment of bites inflicted by that genus and no other, a position fully endorsed by Lieut. Col. Bannerman.[2] Convincing experimental research and a large clinical experience combine to prove that the antivenene prepared from the cobra venom is, if used in time, a specific for cobra bites, but useless in the treatment of bites of the viper. Reasoning from this standpoint, it seems to me that an antivenene prepared from the venom of our rattlesnake ought to prove successful in the treatment of bites inflicted by this genus of snakes.

Only one accident has so far occurred in the Parel Laboratory. A coolie in handling a cobra struck one of his thumbs against one of the fangs. Antivenene of doubtful age was used at once, but proved useless in warding off the immediate symptoms provoked by the poison. Great prostration set in, he became paralyzed in the lower limbs and unconscious. Antivenene from another source was quickly procured and administered half an hour after the accident occurred. The threatening symptoms disappeared promptly and in three hours the patient was able to walk to his house. Gangrene of the end of the thumb, however, occurred, which proved the intensity of the local action of the cobra venom.

Therapeutics.

[Our readers are invited to send favorite prescriptions or outlines of treatment, such as have been tried and found useful, for publication in these columns. The writer's name must be attached, but it will be published or omitted as he may prefer. It is the aim of this department to aid the general practitioner by giving practical prescriptions and, in brief, methods of treatment for the diseases seen especially in every-day practice. Proper inquiries concerning general formulae and outlines of treatment are answered in these columns without allusion to inquirer.]

Tapeworm.

There are two principal varieties of tapeworm in man, the tinea solium, the pork tapeworm, and tinea saginatta or beef

1. Snake Venoms; Their Physiological Action and Antidote, Journal Bombay Natural History Society, p. 220, vol. xiv.
2. The Use of Calmette's Antivenene in Snakebite in India, Journal Bombay Natural History Society, vol. xv.

tapeworm. The latter is much more common in this country, while the former is more common in the continental countries of Europe. The presence of either in the intestinal canal of man may cause no symptoms whatever, and knowledge of their presence is made manifest only when a segment or series of segments appear in the stool. In other cases they give rise to an abnormal and ravenous appetite on account of their interference with digestion and assimilation of food. In other cases still reflex nervous disturbances may arise. Before outlining a treatment of tapeworm the general condition of the patient must be considered. If heart lesions are present and the patient has reached the age when changes in the heart muscle have taken place, care must be observed not to give those preparations which tend to depress and to produce too strong irritation to the gastrointestinal mucous membrane. Where marked arteriosclerosis is present those preparations which tend to produce the least amount of vomiting should be administered. It must also be remembered that those tæniafuges which produce the greatest subjective disturbances do not, in most cases, constitute the best treatment. On the other hand, it is sometimes necessary to employ these drastic measures before the entire worm can be removed. After the patient's physical condition has been ascertained he should be put on a modified diet for two days, during which time the intestinal tract must be cleared, and on the evening previous to administering the vermifuge a good cathartic must be given and the following morning the preparation given while fasting, as the head is then in a state of least protection. This should be followed in a few hours by another laxative. The patient may then be allowed to eat food which will tend to increase intestinal peristalsis. Herring salad combined with onions and garlic is recommended by some authors, given the evening before the administration of the taenifuge. No breakfast should be taken and the medicine should be given while the patient is still in bed and repeated as necessary. The recumbent condition is in most cases necessary in order to prevent nausea and vomiting as well as the vertigo which frequently accompanies their administration. The purgative to be used after giving the anthelmintic depends to a great extent on the physical condition of the patient. Senna, jalap, calomel, saline laxatives or castor oil, any one of these, as a rule, may serve the purpose. The infusion of senna made up as follows has been recommended:

℞ Pulv. sennæ fol. ..... ʒiiss-iii 10-12
Aquæ ..... ʒiii 90

M. Fiat infusum. Sig.: The entire amount sweetened with an ounce of the syrup of bitter orange peel, to be taken at one dose one hour after the anthelmintic.

Should this fail to act within one or two hours, a purgative enema should be given. For this purpose Bérenger-Feraud recommends the following combination:

℞ Pulv. sennæ ʒiiss-3iii 10-12
Sodii sulph. ..... ʒx 40
Aquæ ..... ʒviii 240

M. Sig.: To be given as an enema.

Frequently a large enema of the normal saline solution will take the place of the foregoing and will prevent the worm from attaching itself to the intestinal wall after it has reached the large intestine.

The following preparations have been found to be the most successful in getting rid of teniæ: Pomegranate, male fern, kousso, pelletierin sulphate or tannate (the alkaloid of pomegranate), kamala, turpentine, pumpkin seeds and thymol.

POMEGRANATE.

Pomegranate or granatum is a bark which contains two alkaloids possessing teniacidal properties—pelletierin and isopelletierin. The bark given in the form of a decoction is, as a rule, better than its alkaloids given alone. The decoction is prepared as follows: Macerate two ounces (60.) of the pomegranate root, chopped up fine, in water for twelve hours. Then add one and a half pints (720.) of cold water, boil and macerate for twelve hours and evaporate to one pint (480.) and administer in divided doses within one hour. If no purgative effects are obtained in one or two hours, a dose of castor oil should be given.

Bamberger recommends the following combination:

℞ Granati rad. cort. ..... ʒiss-ii 45-60
Macerate for 24 hours, then boil in
Aquæ dest. ..... ʒxii 360
Evaporate to 6 ounces and add
Extracti filicis maris ether. 3ii 8

M. Sig.: One-third the amount to be taken (fasting) every half-hour. Take a saline aperient the night before, and no food other than soup or tea, or a salt herring.

The following combination has been recommended by Fleischmann in *Clin. Ther.* in the treatment of tapeworm:

℞ Ext. granati rad. ..... gr. xl 2 | 65
Ext. filicis maris ..... gr. xl 2 | 65
Pulv. radicis granati ..... gr. viii | 50

M. Fiant pil. No. xl. Sig.: One-half hour after giving the child a cup of milk, give ten of these pills every half-hour, keeping others in reserve in case some are vomited. A few hours afterward give a dose of castor oil.

The taste of the decoction of granatum is extremely nauseating and for this reason its active principle, pelletierin, is substituted. The dose of the latter ranges from two to five grains (.12-.30). The addition of tannic acid prevents its absorption and toxic symptoms without altering its effect on the worm. Therefore, the tannate is the best preparation of this alkaloid and it is tasteless. French speaks of giving one-half an ounce of magnesium sulphate, followed in twenty minutes by the pelletierin dissolved in lemonade, and this in turn followed in twenty minutes by another dose of magnesium sulphate.

The following is an old-time but serviceable combination:

℞ Granati radicis ..... ʒss 15
Seminis peponis ..... ʒi 30
Ext. filicis maris ether. 3i 4
Pulv. ergotæ ..... ʒss 2
Pulv. acaciæ 3ii 8
Olei tiglii ..... gtt. ii | 12

M. The pomegranate and pumpkin seed should be thoroughly mixed in a mortar with the ergot and boiled for fifteen minutes in water and strained. The croton oil is first mixed with the acacia and male fern and then formed into an emulsion with the decoction.

The following combinations are serviceable in some instances:

℞ Olei terebinthinæ ..... ʒss 2
Olei ricini ..... ʒss 15
Muc. acaciæ q. s.

M. Fiat emulsio. Sig.: To be taken at one dose after fasting. Or:

℞ Ext. granati rad. cort. ..... ʒiii 90
Sodii bicarb. 3i 4
Aquæ ..... Oi 480

M. Macerate six hours in hot water. Sig.: Take in the morning after fasting in three equal doses, following the last with oleum ricini, ounce one (30.).

PEPO.

The use of pumpkin seeds in the removal of tapeworm is as effective as it is simple. Like too many preparations, however, their efficiency depends to a great extent on where they are purchased. They should be obtained from a reliable seed firm in order to insure their strength. About two ounces should be hulled, thoroughly crushed to a fine powder, mixed with a small amount of honey and spread on a thin piece of bread and eaten as an ordinary sandwich. This should be followed in one or two hours by one of the cathartics previously mentioned. Some authors recommend an infusion or decoction of pumpkin seed instead of the foregoing preparation. This is a mild teniacide and can be given to children in one or two ounce doses. Pumpkin seed is dependent on a resinous principle, peporesin, as supposed by some, but this has not been definitely proved. It is a harmless remedy and can be repeated without danger in case of failure on first trial.

KAMALA.

Kamala is another preparation recommended. It is a fine granular powder, inodorous and tasteless. It can be administered in one to two-dram (4.-8.) doses of the powder, or in the form of the tincture. Age impairs its efficiency. It is sometimes given combined as follows:

℞.	Kamala ..... gr. xx	1	30
	Pelletierini tannatis ..... gr. ii		12
	Confect. sennæ ..... ʒss	2	

M. Sig.: The entire amount at one dose after fasting. This amount may be given to a child of 8 to 10 years.

MALE FERN (ASPIDIUM).

This preparation is usually the one relied on for the removal of tapeworm. The crude drug is never used, but in its stead the oleoresin, given in doses ranging from dram one-half to two (2.-8.). The ethereal extract is less frequently given. This is prepared by evaporating the oleoresin at a very moderate heat in the oven; therefore, its dose is somewhat less than the oleoresin. The latter is best given dropped in capsules and administered in divided doses fifteen minutes apart. It is very essential that a fresh preparation be used. The fresh oleoresin is greenish in color.

Male fern may be given combined with oil of turpentine as follows:

℞.	Oleoresin aspidii ..... ʒiss	6	
	Olei terebinthinæ (rect.) ..... gtt. xx	1	30
	Spts. chloroformi ..... m. x		65
	Mucil. acaciæ q. s. ad ..... ʒi	30	

M. Sig.: Shake well and take one-half the amount at night after fasting, and the remainder the following morning, followed in one hour by a brisk purge. Or:

℞.	Oleoresinæ aspidii ..... ʒiss	6	
	Olei peponis express ..... ʒiv	15	
	Olei terebenthinæ ..... gtt. xx	1	30

M. Sig.: To be taken at one dose after fasting, followed by a purgative. Or:

℞.	Ext. filicis ether ..... ʒiss	6	
	Pulv. kamalæ ..... ʒii	8	
	Mucil. acaciæ		
	Syr. simplicis, āā q. s.		
	Aq. cinnamoni q. s. ad ..... ʒiii	90	

M. Fiat emulsio. Sig.: One-half the amount to be taken at bedtime and the remainder in the early morning.

CUSSO.

Cusso is recommended, given in the form of the infusion, two or three drams (8.-12.) to four ounces (120.) of boiling water and allowed to cool. It may be given in the powder form combined with male fern as follows:

℞.	Pulv. cusso (kousso) ..... ʒii	8	
	Ext. filicis maris ether ..... ʒi	4	

M. Fiant capsulæ No. xxiv. Sig.: Four to be taken every fifteen minutes.

Pregnancy is a positive contraindication to the administration of cusso.

THYMOL.

Thymol is recommended by some authors as a very efficient teniacide, given in capsules or combined as follows:

℞.	Thymol ..... ʒiss	6	
	Saccharī ..... ʒii	8	

M. Fiant chart. No. xii. Sig.: One powder every thirty minutes, followed by castor oil.

Medicolegal.

Validity of Notice Required for Health Insurance.—The Supreme Judicial Court of Maine says, in Whalen vs. Equitable Accident Company, that the former was insured against loss resulting from sickness caused by various diseases, among which was dysentery. The policy provided that failure to give written notice as therein provided within 10 days of the date of the beginning of any sickness should invalidate any and all claims under it. The insured fell sick October 17, and no notice was given to the company or its agents of the sickness until December 30. Within 30 days after the insured became sick with dysentery, but not within the first 10 days of his being sick, he became insane. The court holds that the condition in the policy was a valid one, and by its terms the failure to give notice within 10 days of the date of the beginning of the insured's sickness invalidated all claims under the policy. The provisions of the Maine statute to the effect that notice of accident, injury, or death may be given to a foreign or domestic casualty or accident insurance company insuring at any time within 30 days after the happening of an accident or injury or death, and shall be valid and binding on the company, do not extend to cases of health insurance. Where a health insurance company, after the expiration of 10 days from the time a party insured became ill, but before it knew the date when he did become ill, sent blank forms for proof of claim to him to be filled out, such conduct did not constitute a waiver on its part of the provision requiring the insured to notify it within 10 days from the beginning of the sickness.

Skill and Care Required of Physician and Surgeon.—The Supreme Court of Rhode Island says, in the malpractice case of Bigney vs. Fisher, that whether the defendant used proper skill and care in setting the broken bone in the plaintiff's leg and his subsequent professional treatment of the case were necessarily questions to be determined by the testimony of experts in the science of medicine and surgery. Barker vs. Lane, 23 R. I. 224. "The implied contract of a physician or surgeon is not to cure—to restore a fractured limb to its natural perfectness" (McCandless vs. McWha, 22 Pa. 261), but to treat the case with that degree of diligence and skill which are ordinarily possessed by the average of the members of the profession in good standing, in similar localities, regard being always had to the state of the medical profession at the time. If more than this is expected, it must be expressly stipulated for. S. & R. Neg. (5th Ed.), sec. 605; Am. & Eng. Ency. Law, vol. 22 (Rev. Ed.) 799-801; Smothers vs. Hanks, 34 Iowa, 286; Almond vs. Nugent, 34 Iowa, 300; Small vs. Howard, 128 Mass. 131. In short, a physician or surgeon must apply the skill and learning which belong to his profession (Higgins vs. McCabe, 126 Mass. 13); and, if he do this, he discharges his full liability. The law relating to malpractice is well stated in the late case of Pike vs. Honsinger, 155 N. Y. 201. Under the evidence submitted in this case the court thinks it was clear that the defendant possessed all of the qualifications called for by the rule stated in that case, that he used his best judgment in the case, and that he exercised at least an ordinary, if not, indeed, a high, degree of care and skill in his professional treatment of the plaintiff, so that the verdict of the jury (apparently for the plaintiff) was clearly wrong, and must be set aside, and a new trial granted.

Right to Determine Physical Examination.—The Court of Civil Appeals of Texas says that, in International & Great Northern Railroad Co. vs. Gready, a personal injury case brought by the latter party, who had suffered injuries to his head, back, spine, kidneys, etc., that he consented to an examination by three physicians appointed by the court, which was made; the court adjourning at 11 a. m. for that purpose. The court convened at 2 p. m., and waited three hours. At that time two of the physicians appeared and testified. On cross-examination they stated that they had applied all the tests except chloroform and the electric battery, whereon the company's counsel made a motion to have these tests applied, whereon the court asked one of the physicians how long it would take, and he answered, "I don't know." On further inquiry the physician stated that it was "very difficult to say. For instance, we must get the battery in good working order, which is not always the case. The battery is not used all the time, and it has a trick of getting out of order, and there you are." Whereon counsel for the plain-

tiff said, "We think there ought to be some limit to this thing, and we don't propose to submit to the pain of it," whereon the court said, "Well, we won't go any further, then." This all occurred in the presence of the jury, and was taken advantage of in argument by both sides. The Court of Civil Appeals holds that the court did not err in not ordering a second or further examination against the will of the plaintiff. It says that the court was without power to require him to submit to an examination. Railway vs. Cluck (Tex. Sup.), 77 S. W. Rep. 403. Such an examination being subject to the consent of the plaintiff, he could, the court thinks, have terminated an examination while same was being conducted.

Can Not Be Cross-Examined as to Opinions in Other Cases.—The Supreme Court of Illinois says, in Chicago & Eastern Illinois Railroad Co. vs. Schmitz, a personal injury case brought by the latter party against the railroad company and others, that a certain physician was put on the stand as a witness for the plaintiff to testify in regard to her injuries, and on the cross-examination it was attempted to discredit the witness by asking him questions in regard to the professional opinions he had given in other suits brought to recover damages for personal injuries against one or more of the defendants in this case. It was also sought by the defendants to show by direct examination of certain witnesses that the physician in question was interested as a medical man in a large number of personal injury suits against corporations. The court holds that there was no error in refusing to admit this class of testimony. It says that cross-examination on independent cases of the same character, and about the same time as the principal case, is not allowed. The rule is more strict against the use of this kind of testimony in direct examination. The acts and declarations either of strangers, or of one of the parties to the action in his dealings with strangers, are irrelevant. There is nothing in the case of Chicago City Railway Co. vs. Carroll, 206 Ill. 318, which is opposed to the view here expressed. In that case it was held to be proper to ask a physician on cross-examination in a personal injury case by whom he was paid, etc. But the testimony whose introduction is there justified, applies directly to the relation of the witness to the party in interest and to the particular case, and not to his relation with other parties and other cases. It was there said: "It is always competent on cross-examination to ask a witness if he is not in the employ of a party, or if, at the time he rendered the particular service, he was in the employ of such party, for the purpose of showing his relation in the case and his interest in it, as affecting his credibility and weight of his evidence."

Current Medical Literature.

AMERICAN.

Titles marked with an asterisk (*) are abstracted below.

American Medicine, Philadelphia.

December 10.

1 *Some Fundamental Problems in Obstetrics and Gynecology. J. C. Webster.
2 Has a Persistance of the Muellerian Ducts Any Relation to the Condition of Crypt Orchidism? A. G. Pohlman.
3 *Carbohydrate Metabolism; Relation of the Different Tissues to the Destruction of Sugar. Frederick A. Rhodes.
4 *The Dangers of the Microscope in the Early Diagnosis of Pulmonary Tuberculosis. Herbert C. Clapp.
5 Brain Tumor and Trauma: A Pathologic Study. Edmund W. Holmes.
6 Fibroma of the Uterus, Complicated by Disorders of the Heart and Kidneys. Uremia Without Nephritis from Tumor Pressure. George E. Shoemaker.
7 *The Relation of the So-called Piroplasma Hominis and Certain Degenerative Changes in the Urethrocytes. Charles F. Craig.

1. **Problems in Obstetrics and Gynecology.**—Webster discusses the determination of sex, the anatomy and physiology of the ovary, the antagonism between the maternal organism and the ovum, and the functions of the placenta.

3. **Carbohydrate Metabolism.**—Rhodes made extracts from animals killed immediately after the taking of a heavy carbohydrate diet and after they had been starved for some time. He found that all the organs contain enzymes which may be extracted and which cause the destruction of grape sugar. The pancreas showed this action more positively than any other organ. The extract which gives the best results is one made by using glycerin and alcohol. Rhodes found by experiment that this extract shows the presence of pronounced diastatic enzymes as well as the glycolytic. Clinically, good results were obtained by the administration of the glycerin-alcohol extracts of pancreas, spleen and muscle. The best results were by hypodermic injections of combined pancreas and muscle. Judging from the peculiar action at times in the different experiments, Rhodes believes that it is quite possible that there is more than one enzyme concerned in the sugar-destruction and that at times other enzymes interfere with the glycolytic action.

4. **Dangers of the Microscope in Tuberculosis.**—In consonance with a number of other writers, Clapp decries implicit reliance on the microscopic findings for a diagnosis of incipient pulmonary tuberculosis. He says a skilled auscultator (and all physicians should be skilled auscultators) can very often recognize an incipient case before tubercle bacilli appear in the sputum. Very often, not by physical examination alone, but by a thoughtful consideration of symptoms and physical signs, in connection with a close study of the personal and family history of the patient, aided, if necessary, by the tuberculin test, a satisfactory conclusion can be reached weeks and months before the bacilli appear in the sputum or even before the sputum itself appears, and thus gain time enough, perhaps, to save the patient.

7. **So-Called "Piroplasma Hominis."**—A most careful study of this subject has convinced Craig that Chowning, Wilson and Anderson, who investigated the etiology of a fever prevailing in the Bitter Root Valley for a number of years, and who concluded that it was due to a minute parasite which inhabited the red blood corpuscles, have mistaken areas devoid of hemoglobin in the red cell, which occur frequently in disease, for a protozoan parasite. He also refers to a report by Stiles, Chief of Division of Zoology, which details the results of his study of ten cases of spotted fever, in none of which Stiles succeeded in finding any structure in the blood which he could interpret as a protozoan organism.

Medical Record, New York.

December 10.

8 *Problems in Dietetics. W. Gilman Thompson.
9 Rheumatism. George E. Malsbary.
10 *Treatment of Pneumonia in Adults. Morris Manges.
11 A Question in Gall-bladder Surgery: Cholecystotomy or Cholecystectomy? Harris F. Brownlee.
12 *Foreign Bodies in the Vermiform Appendix Met with in 1,600 Necropsies. Louis J. Mitchell.
13 A Case of Crypt Orchidism. John M. France.

8. **Problems in Dietetics.**—Thompson attempts to solve some of the complex problems in the matter of dieting that frequently confront us and in which regulation of the food is of special importance. On the other hand, there are a number of nutritional disorders the etiology of which is still so obscure that the formulation of proper dietetic principles becomes unusually difficult. In typhoid, he deprecates the undue prolongation of the milk diet, as it is liable to produce scurvy, it protracts convalescence and, by impoverishing nutrition, makes the patient more liable to serious complications. He makes it a rule to commence the feeding of semi-solid food, in ordinary cases, on the day when the body temperature first reaches normal. Soft cooked eggs, baked custard, junket, milk toast, mutton or chicken broth, thickened with rice or crackers, plain, delicate foods like blanc mange and wine jelly, and light farinaceous foods may then be given. On the third day, if convalescence be uninterrupted, a scraped beef sandwich is given. Thompson recommends early increase in the dietary in very mild cases in general, but not if there be much tympanites, diarrhea or recent severe hemorrhage. In asthenic cases the maintenance of better nutrition is imperative. When much tympanites exists during a milk diet, beef juice and egg albumin or broths should be substituted for

the milk for two or three days. Cases of arthritis deformans are treated very much as if they had chronic phthisis, or chronic sepsis—by forced feeding—using largely fat foods, such as butter, cream, eggs, oils, bone marrow, bacon, etc. With a little care this dietary is well tolerated. The ordinary meals should be supplemented by two or three luncheons during the day. The use of simple bitters before meals or of dilute hydrochloric acid with nux vomica after meals, and the promotion of elimination of waste are of value in most cases. In nephritis the problem is a very complex one, and although in acute cases the conventional diet is demanded, in chronic cases there is occasion for greater latitude. In these cases the danger of meat eating is overrated considerably, and there are some cases in which its moderate use is positively demanded. Such cases are (1) those of very long standing, in which the chief symptom is a moderate albuminuria; (2) those in which anemia and loss of strength and weight are the prominent features, and (3) those in which some associated disease makes the use of animal food desirable. In diabetes, the author is convinced that a routine dietary may beget more harm than good. Each case should be given separate dietetic study. Mild cases do well on a diet chiefly proteid. Serious cases should be given more fats, such as butter (one-quarter pound or more a day), cream diluted with water and drunk as a beverage (one pint or more a day), the fats of cod-liver oil, olive oil on salads, sardines, etc.; olives, oily nuts, eggs, bacon and ham fat, bone marrow, suet and lard; rich cheese, soups, enriched with "dripping" and fat fish, mackerel and salmon, fat meats, goose and duck and the tender fat of corned beef. Potato is given best in the form of "Saratoga chips." Lithemia requires more or less abstention from proteid food, the copious use of water (60 or 70 ounces a day), plenty of fresh air and rest, especially before the principal meal of the day. The dietetic treatment of arteriosclerosis is somewhat similar to that of lithemia, though the quantity of water to be allowed must be judged carefully, so as not to overburden a weak heart or to encourage inadequacy in damaged kidneys. In gout, the following generaal principles are of prime importance: 1. To reduce the consumption of food as a whole; 2, to increase the consumption of water; 3, to eliminate entirely sugars and sweets of every kind, as well as alcohol; and 4, to reduce the consumption of red meats to a minimum. The dietetic treatment of rheumatism should, in general, resemble that of gout, a milk diet during the acute attack and restriction of meat and sweets in the interval. In closing, Thompson enters a word of protest against the common practice of basing dietetic and other treatment of stomachic disease on the results of a single gastric analysis. At least half a dozen tests should be made before any definite conclusions are justifiable, dietetic or otherwise.

10. **Treatment of Pneumonia.**—Manges defines pneumonia as a general disease, the tendency of which is to recovery after the lapse of sufficient time for the body to produce its own antitoxin. When treatment is required it must be directed against the toxemia: 1, to maintain life; 2, to support the heart; 3, to control undue fever; 4, to relieve suffering; 5, to control complications. Intelligent nursing and careful dieting will meet the first indication. The drugs which best support the heart are strychnin, caffein, alcohol, camphor and ergot. There should be no hesitancy to use them freely, and hypodermic medication should be substituted promptly for medication by mouth, if the latter fails to produce the desired result. Adrenalin, the precordial icebag, cupping, and venesection are also useful measures. Fever may be reduced by the use of large, flat icebags to the affected area, but this is not to be looked on as a specific and it is to be remembered that carelessness in their use may give rise to an intercostal neuritis. Cold baths are absolutely contraindicted. Cold sponging and cold packs are often useful, but are to be used with caution. Properly applied moist compresses enveloping the entire chest often comfort the patient, although they are not of much therapeutic use. The rational use of small doses of any of the coal tar products may add not a little to the patient's comfort. The suffering incident to the pleuritic pain and the distressing cough is best relieved by the hypodermic injection of small doses of morphin, grain 1/10 to 1/8, or heroin hydrochlorid, grain 1/8 to 1/6. The Paquelin cautery often acts magically in quieting pleuritic irritation. All administration of drugs, etc., should be done at stated times; during the intervals between them, rest or sleep should be procured. The complications require the treatment pursued ordinarily. Manges warns against routine or "schedule" plans of treatment.

12. **Foreign Bodies in Appendix.**—Mitchell gives a list of foreign bodies found in the appendix during his service as coroner's physician. One or more grape seeds were present in 5 cases; one or more shot in 3 cases, and fragments of bone in 2 cases. Other objects found were a fragment of shingle nail, a globule of solder, a piece of nutshell, the centrum of the vertebra of a small fish with part of the vertebral arch attached, and fragments, apparently, of ash or stone. None of the appendices containing these bodies showed any signs of inflammation, either past or present.

New York Medical Journal.

December 19.

14 A Comparative Study of Idiopathic Epilepsy in Animals and Man. L. Pierce Clark.
15 *Superannuated Trolley Cars for Consumptives. William H. Peters.
16 The Elective Line of Renal Incision—Hyrtl's Exsanguinated Renal Zone. Byron Robinson.
17 *Method of Dealing with Circum-rectal Infections. J. L. Jelks.
18 Some Observations on the Non-operative Treatment of Squint; the Worth Amblyoscope. Wm. C. Posey and H. Maxwell Langdon.
19 *Ultimate Results of Mechanical Treatment of Pott's Disease in Dispensary Practice. Henry Ling Taylor.
20 Public School Children and Preventive Medicine. J. S. Lankford.

15. See THE JOURNAL, vol. xlii, page 1232.

17. **Circum-Rectal Infections.**—Jelks' operation consists of free incision and thorough curettage after irrigating the abscess with a formalin solution. The cavity is then packed with iodoform gauze. After the second day, gauze saturated in balsam of Peru, castor oil and ichthyol is used, the preliminary formalin irrigations being continued. Should large cavities remain unfilled after repeated curetting, they may be closed with 20-day catgut. Under this procedure the abscess cavity is converted into a clean surgical wound, thus favoring healing without attendant suppuration; nor is the integrity of the rectal sphincter diminished. Jelks throws out the surmise that the external sphincter has a distinct ganglion, and that division of the nerves about the rectum may be accountable for temporary atony and impaired function.

19. This article has appeared elsewhere. See THE JOURNAL of December 10, ¶55, page 1822.

Medical News, New York.

October 19.

21 The Immediate Repair of the Pelvic Floor and Perineum. Edward P. Davis.
22 Recent Advances in Surgery. Carl Beck.
23 *The Influence of the First and Second Dentition Periods in the Etiology of Epilepsy. William P. Spratling.
24 Care of Fractures from the Standpoint of the General Practitioner. W. S. Newcomet.
25 *New Method for Staining the Capsules of Bacteria; Preliminary Communication. Leo Buerger.
26 Chloroma with Leukemia, with a Study of Cases Reported Since 1893. George Dock and A. S. Warthin.
27 *Intracerebral Injections of Antitetanic Serum in Traumatic Tetanus. S. D. Hopkins.

23. **Dentition and Epilepsy.**—Spratling maintains that we are never justified in looking on the convulsions of infancy and early life as harmless manifestations, because they often end in established epilepsy. The lesson physicians often fail to learn is the necessity for constantly recognizing in such children the presence of the convulsive tendency. To keep the child free from convulsions in the future this tendency must be borne in mind and always respected. For some years Spratling has been studying the age at the onset of epilepsy in several thousand cases to determine what proportion of these children acquired epilepsy coincident with the first or second dentition periods. In 1,215 cases the disease occurred between the first and twentieth years, inclusive, represent-

ing 80 per cent. of all the patients admitted to the Craig Colony up to that time. After the first year there was a very decided and continuous decline in the number of cases up to the sixth year, when there was a decided rise, lasting for three years, during the period of second dentition. During the first year of life the greatest number of cases occurred during the seventh month, which marks the beginning of the influence of the first dentition period. It is evident, then, that difficult dentition may, in suitable subjects, constitute a sufficient irritant to cause convulsions, and these may ultimately lead to epilepsy. By suitable subjects, Spratling means infants who inherited a neuropathic tendency to disease; whose parents had epilepsy or insanity, or who were alcoholic or suffered from some other general vice that could be transmitted to the offspring in some form capable of vitiating its powers of resistance to disease. He does not believe, however, that difficult dentition alone, in a child who inherited no ancestral taints, and who at its birth is free from a tendency to nervous disease, can cause epilepsy. He advises the exercise of caution in laying the true cause in cases of this kind where it belongs, for the reason that gastrointestinal disorders, the sequelæ of the eruptive fevers and other factors common at this age may produce similar results.

25. **New Method for Staining Capsules of Bacteria.**—The method described by Buerger depends on the rapid fixation of the bacteria while still alive and when spread in a medium which prevents dissolution of their capsules. The necessary solutions are: Mueller's fluid, saturated with bichlorid of mercury (ordinarily about 5 per cent.). 2. Beef, human or other blood serum, diluted with an equal amount of normal salt solution; or acetic or pleural fluid. 3. Eighty to 95 per cent. alcohol. 4. Tincture of iodin, U. S. P. 5. Freshly prepared stain, anilin water gentian violet made up as follows: Analin oil, 10; water, 100; shake, filter and add 5 c.c. saturated alcoholic solution of gentian violet; or, 10 per cent. watery fuchsin. 6. Two per cent. watery salt solution. The culture is thinly and carefully spread over a perfectly clean slip by means of a drop of diluted serum. Just as the edges begin to dry, the fixing fluid, solution No. 1, is poured on, the cover gently warmed over the flame for about three seconds, rapidly washed in water, flushed once with alcohol, and then treated with iodin for from one to two minutes. The iodin is in turn thoroughly washed off with alcohol and the specimen dried in the air. Staining for two to five seconds, and washing with salt solution completes the procedure. The specimen is mounted in the salt solution and ringed with vaselin. Sputum and pus can be stained in a similar manner, the addition of serum being unnecessary, except in very mucoid, stringy, purulent exudates.

27. **Intracerebral Injections of Antitetanic Serum.**—Hopkins reports two cases of traumatic tetanus treated successfully by intracerebral injections of antitetanic serum, which he considers the correct method of treatment for the disease. The first patient stepped on a rusty nail, and symptoms of tetanus supervened on the fourth day following. Through a small trephine opening in the right frontal bone, 20 c.c. of antitetanic serum were injected into the right frontal lobe of the cerebrum. The trismus and spasms, which were constant before the serum was injected, ceased 72 hours after the operation, and the patient made a complete recovery. The second patient had a blank cartridge explode in his hand, and 19 days later marked trismus was present. Roux's point was selected for injecting the serum into the brain substance. The needle of the syringe was introduced to a depth of two inches, with the point directed downward and inward toward the median line, and 10 c.c. of antitetanic serum were slowly injected during the withdrawal of the needle. Ten more c.c. were injected in the same manner, with the point of the needle directed forward and downward and not toward the median line. All the symptoms subsided after 48 hours, the patient made an uneventful recovery. In a third case, an exploding blank cartridge entered the right knee. Fourteen days after the accident the symptoms were so alarming that medical aid was sought. The spasms occurred so frequently that it became necessary to use chloroform. The pulse was 150, temeparture 101, respiration 50. Twenty c.c. of antitetanic serum were injected into the right frontal convolution, but the patient died two hours after operation. Hopkins believes that the success of this method of treatment depends on the use of large quantities of the serum.

Boston Medical and Surgical Journal.

December 8.

28 *Serum Diagnosis of Tuberculosis. Arloing and Courmont.
29 Remarks on the Jurisprudence of Civil Malpractice Based Principally on the Decisions Rendered by French Courts. (To be continued.) Charles Greene Cumston.
30 *Diagnosis of Incipient Pulmonary Tuberculosis. J. Perkins.

28. **Serum Diagnosis of Tuberculosis.**—The use of homogeneous and glycerinated bouillon cultures of the bacillus of human tuberculosis has enabled Arloing and Courmont to investigate the agglutinating power of fluids and especially the serum of tuberculous patients, and thus establish serum diagnosis of tuberculosis. The advantages of the method, as enumerated by them, are those of serum diagnosis in general: 1, absolute harmlessness, since all that is necessary is to withdraw a little serous fluid, and it can be applied in all cases, whether febrile or not, whether seriously or slightly ill. 2. Ease and rapidity, since it is not necessary to have the patient under observation, and it requires only a few hours for its accomplishment. 3. The delicacy of the reaction in cases where the lesions are discrete or latent and difficult to recognize by the usual methods. The authors emphasize that the technic for maintaining suitable fluid cultures and the performance of serum diagnosis require that fairly exact and indispensable conditions should be followed, on account of the slight degree of agglutinative power of the serum in cases of human tuberculosis. In cases of slightly advanced pulmonary tuberculosis the agglutinating power of the serum is nearly always constant, but in varying degrees. It varies from 1 to 5, to 1 to 20, and more. In advanced cases, with very extensive or virulent lesions, the serum reaction is often absent, or very slight. It may also diminish in intensity and disappear as the disease becomes progressively worse. The authors have found that the agglutinative reaction in tuberculous subjects appears most often and within certain limits in inverse ratio to the gravity of the infection and the extent of the lesions. In case of suffering from other diseases and in which the clinical data do not reveal positive signs of tuberculosis, the serum reaction is an aid in disclosing a large number of cases of latent tuberculosis. Arloing and Courmont sum up the practical value of the procedure as follows: 1. A positive serum reaction in the case of a suspected subject is a diagnostic point of great value in establishing the existence of visceral tuberculosis still active or having become inactive recently. 2. A negative serum reaction is of less value as a negative sign, since agglutination is absent in a certain number of tuberculous cases. 3. The absence of the reaction in cases of advanced tuberculosis, where serum diagnosis is no longer necessary, may, in certain cases, confirm an unfavorable prognosis. On the other hand, in the case of suspected tuberculosis, in the absence of clinical signs and symptoms of importance, the absence of the reaction may aid in eliminating the disease.

30. **Diagnosis of Incipient Pulmonary Tuberculosis.**—Perkins comments on the tendency on the part of many to rely too much on laboratory findings and too little on thorough clinical work. He urges that the diagnosis of pulmonary tuberculosis in its early stages be made by judiciously connecting the physical signs and clinical history with the pathologic lesions and systemic effects of a slight tuberculous infection.

Lancet-Clinic, Cincinnati.

December 10.

31 *Insanity in Relation to Obstetrics and Gynecology. Henry F. Lewis.
32 President's Address, Ohio Valley Medical Association. A. M. Hayden.
33 The Diagnosis and Medical Treatment of Chronic Ulcer of the Stomach. J. D. Dunham.
34 Chronic Gastric Ulcer, with the Presentation of Two Cases. W. D. Hamilton.

31. See abstract in THE JOURNAL of November 12, page 1491.

St. Louis Medical Review.

December 10.

35 Treatment of Malignant Disease of the Breast. Charles Lester Leonard.
36 The Social Significance of Defective Speech. Percy Fridenberg.

Journal of Medical Research, Boston.

November.

37 *Physiologic Action of Azoimid. Letchworth Smith and C. G. L. Wolf.
38 The Differentiation of Bacillus Diphtheriæ, Bacillus Xerosis, and Bacillus Pseudo-diphtheriæ, by Fermentation Tests in the Serum-water Media of His. Arnold Knapp.
39 The Effect of Filtration on Bacteriolytic Complement. Edna Steinhardt.
40 Specific and Non-specific or Group Agglutinins. Wm. H. Park and Katharine R. Collins.
41 *Comparative Histology of Vaccinia and Variola. James Ewing.

37. **Physiologic Action of Azoimid.**—Azoimid is a protoplasmic poison resembling in its action hydrocyanic acid. It can be made by the action of sodium nitrate on hydrazin hydrochlorid, but, on account of the difficulty of preparing it in this way, it is better prepared from hippuryl hydrazin, dissolving in dilute soda and boiling with sulphuric acid. Smith and Wolf have experimented with this substance with a view to ascertaining its exact physiologic action. They noted its effect when respired, and when given by intravenous injection, on muscle and nerve. They found that these structures are paralyzed, with a preliminary stage of increased excitability. They appear to be affected simultaneously. The vapor of azoimid inhaled causes excitation of the respiratory centers, with subsequent paralysis. The blood pressure is lowered, primarily because of the vasomotor disturbance. The intestine and kidney take part in vasodilation in exceptional instances only. Other of the viscera are the main factors in the process. The acid is the most powerful of the compounds containing the trinitrogen group. The introduction of a phenyl radical diminishes the effect of the complex. Azoimid forms a compound with methemaglobin similar to that formed by hydrocyanic acid. The authors could not make out the existence of an azoimid hemoglobin or an azoimid hematin.

41. **Histology of Vaccinia and Variola.**—Ewing presents the results of a study of vaccinia and variola begun by him in 1901 and still remaining incomplete. His work was mainly guided by the endeavor to distinguish between specific vaccine bodies and other cell changes, and to ascertain what differences in morphology exist between vaccine bodies, as occurring in rabbits and man and those produced in any other animals which may be made to react to vaccine. The work began with the examination of the material secured from autopsies on 30 cases of variola and was continued by a study of vaccine lesions. The latter studies lead Ewing to the conclusion that there is a specific vaccine body, many of which follow a definite cycle of development; but their minute morphology, especially the connection of many of them with the reticulum of the cell, strongly indicate that these bodies are degenerating portions of the cyto-reticulum. The specific vaccine body shows, in many instances, definite connections with the cytoplasm of the epithelial cell which are applicable only on the supposition that this body is a part of the cytoplasm. The form, size and structure of the vaccine body is so irregular as to suggest the cycle of a degenerative process rather than that of a living micro-organism. The general histology of vaccinia shows that an active diffusible toxin similar to that of diphtheria is at work in the process from its beginning, but the production of such toxins is not the rule with protozoa. The comparative study of the action of vaccine on different animals shows that the same general process and, in many respects, the same peculiar intracellular changes are produced in widely different classes of animals, and suggests that the vaccine body is a particular form taken in some warm-blooded animals of a universal property of degenerating epithelial cells. Regarding the intranuclear bodies, Ewing believes that the present data are insufficient to warrant positive conclusions either for or against the protozoan theory. The behavior of these bodies under different fixatives and stains is unsatisfactory for the protozoan hypothesis. The staining reactions are identical with those of certain nuclear elements, namely, nucleoli and linin droplets. The intranuclear rings seem to occur only at a particular stage of the necrosis of squamous epithelial cells. The intranuclear cycle is imperfectly represented in specific lesions of mucous membranes, and may be entirely missing in the cutaneous necrosis of rapidly fatal secondary hemorrhagic cases. On the other hand, said Ewing, the full series of these bodies seems to occur only in variola and only individual forms seem to be duplicated, and these imperfectly, in other lesions.

Journal of the Michigan State Medical Society, Detroit.

December.

42 *The Value of the Tuberculin Test. Irwin H. Neff.
43 Prophylaxis and Treatment of the Common Communicable Skin Diseases. H. R. Varney.
44 *The Combined Use of Plaster of Paris and Elastic Traction in the Treatment of Deformities of the Feet. Charles B. Nancrede.
45 Amblyopia from Methyl Alcohol Used Cosmetically. Daniel Conboy.
46 Remarks on the History of the Mastoid and Radical Operation on the Middle Ear, with Demonstration of Anatomic Specimens. Emil Amberg.

42. **Value of the Tuberculin Test.**—Neff states that a reaction to tuberculin is positive proof of tuberculosis. Failure to react may be of negative value if the tuberculin test is used when the disease is far advanced. When the errors of the diagnosticians using tuberculin are eliminated, the percentage of failures is exceedingly small. Cases apparently recovered often react to tuberculin, thus proving that there is tuberculosis and that the disease is present in a latent form. Owing to the variability of the general and local symptoms of a reaction, Neff urges that reliance must be based entirely on the induced fever. The average time for the reaction is twelve hours, but in some cases it may be delayed as long as twenty hours. He advises the use of large initial doses on the ground that small doses tend to establish a tolerance, thus preventing a reaction. Extreme care is essential when a reaction to tuberculin is suspected. The preliminary temperature should be carefully considered and all errors eliminated. Advanced cases of tuberculosis do not, as a rule, react. If a reaction is secured, it is generally obscured by preliminary temperature oscillations. Neff recommends the use of the tuberculin test in general practice, providing physicians will remember the extreme delicacy of the test, its limitations, and the necessity of the employment of a thorough and unvarying technic.

44. **Plaster-of-Paris and Elastic Traction in Foot Deformities.**—Nancrede presents a feasible and convenient combination of the most essential factors of older methods for the treatment of deformities of the feet. After the forcible correction under anesthesia, preceded or not by tenotomy or the Phelps open operation, extreme care in padding is required, perhaps protecting the parts exposed to extra pressure by soap plaster spread on leather. In the Phelps operation Nancrede omits the division of the posterior part of the capsule and the internal lateral ligament of the ankle joint. The foot is then put up in the best attainable position with plaster, incorporating in the dressing, a light wooden sole with crosspiece, and a few links of chain in the upper part of the leg portion. He says it is advisable to incorporate a strip of wire gauze in the healed portion of the splint to serve as a hinge and prevent breaking of this part of the dressing. After a proper interval, in from five to ten days, according to the nature of the operation on the foot, a segment should be sawed out of the superior aspect of the dressings over the medio-tarsal joint, and rubber bands be adjusted so as to make slight traction, which is to be increased from time to time. After the hiatus produced by the removal of the plaster has been brought into contact, Nancrede advises the application of an entirely new dressing, which in twenty-four hours should have a segment removed and traction is then recommended and maintained until the correction desired is secured, or it is plain that fresh operative measures are requisite, such as an open operation where none such has been done, or some form of osseous excision, where a Phelps incision has been made. Nancrede has never had to resort to osteotomy after the combined Phelps and elastic traction dressing. Careless padding or too rapid and severe traction will, as in all methods where fixed dressings are em-

ployed, be productive of blisters, sloughs, etc., but constant supervision, timely relaxation of tension and removal of portions of the plaster over points of pressure, will usually prevent any serious trouble. When the operator is in doubt it is advisable to remove the whole dressing, protect the projecting points with soap plaster, carefully pad, employ improvised rings of harness felt, or corn or bunion plasters, and remove portions of the wooden sole—in other words, adopt the usual methods employed to prevent undue pressure.

Northwestern Lancet, Minneapolis.

December 1.

47 *Surgical Diseases of the Sigmoid. H. D. Niles.
48 Arteriosclerosis. Herbert W. Jones.
49 Milk Infection. E. W. Humphrey.

47. **Surgical Diseases of the Sigmoid.**—Niles operated on two cases of complete obstruction of the bowel due to volvulus of the sigmoid, the diagnosis being confirmed by operation, and attended two other patients suffering from incomplete stricture of the bowel, resulting, he believes, either from a twist or from some inflammatory lesion of the sigmoid. These two cases were not operated on and consequently the diagnosis was not positively confirmed. As a result of this work Niles carried on some investigations on the surgical anatomy of the sigmoid. The various pathologic changes to which the physiologic functions and anatomic structure and relations of the sigmoid render it especially susceptible, Niles regards as successive steps or stages of one morbid process, rather than as so many different diseases. An impartial study of the various successive pathologic changes that precede, accompany and follow inflammatory obstructions and malignant diseases of the sigmoid, furnishes convincing evidence of how little can reasonably be expected of medical treatment, and how much reliance must be placed on timely operative interference to correct disease in this region. Advanced malignant disease of the sigmoid is always preceded by pathologic processes which should be recognized early and corrected by timely operative procedures. Acute obstruction due to volvulus, unless relieved promptly by inflation of the rectum with water or gas, is always an indication for operative interference. So, too, are all torsions of the bowel with partial or complete stricture. All inflammatory or necrotic processes that include the peritoneal coat of the gut, with or without angulation, or stricture of the bowel, should be regarded as surgical conditions. Finally, says Niles, the known frequency of cancer and all forms of intestinal ulcers in this region, the occasional occurrence of volvulus, a practical consideration of the anatomic structure and relations of the sigmoid, all tend to confirm the belief that inflammatory lesions and obstructive distortions of the sigmoid are by no means rare, and that their rational treatment should be based on the surgical conception of the condition.

Canadian Journal of Medicine and Surgery, Toronto.

December.

50 Complications of Fracture and Amputations. Thomas H. Manley.
51 The Medical Society; Its Place and Equipment. John Hunter.
52 *An Extraordinary Anemia—Report of a Case. F. V. Trebilcock.
53 Urinary Antisepsis in Gonorrheal Urethritis. E. Reinhardt.

52. **Extraordinary Anemia.**—The history of Trebilcock's case, in brief, is as follows: The patient, a young woman, unmarried, showed the most intense air hunger. Her hair was exceedingly sparse and coarse, her face uniformly broadened, and, with the exception of the under eyelids which were noticeably lagged and soft, was very firm under pressure. All expression was lost. The countenance was a pale yellow white without the faintest trace of pink, even on the severest pinching and friction; the ears were translucent so that heavy newspaper print was distinguishable through the lobes. The bulbar conjunctiva was slightly muddy. The neck was uniformly enlarged, with no special swelling at any one point. The thyroid was not palpable; no marked pulsation was visible anywhere. The trunk was also uniformly enlarged and the abdomen more prominent. Careful examination showed no displacement of any organ. The cardiac impulse was forcible. The arms and legs were also swollen and hard. The skin was exceedingly inelastic and dry; no perspiration for months; no rash, only a diffuse scurfiness and occasionally tense itching. The muscular system was normal. Pulse, 160; respiration, 70; temperature, 101. Digestive system normal, except for a marvelously large appetite. Under strict hygiene, simple food, abundance of fresh air, and daily alcohol baths, compound syrup of hypophosphites, with gradually increasing doses of arsenic and thyroid extract, the patient improved slowly but steadily. An interesting feature in this case is the fact that for six months the patient dressed every day a sloughing epithlioma, the odor from which was so obnoxious that she made a bag to cover her own nose and mouth—a sort of respirator—in which she kept pieces of gummed camphor. The camphor fumes would often cause her mouth and nose to be quite sore, and it was during this time that the anemia began to manifest itself.

Annals of Otology, Rhinology and Laryngology, St. Louis.

September.

54 The Epithelial Concresence in the Larynx of the Fetal Pig. Dean D. Lewis.
55 An Operation for the Correction of External Deformities of the Bridge of the Nose. T. Passmore Berens.
56 Inferior Ethmoidal Turbinate Bone. Howard A. Lothrop.

Medical Sentinel, Portland, Ore.

November.

57 Posterior Gastroenterostomy for Simple Conditions of the Stomach. T. W. Huntington.
58 Notes on a Case of Cerebral Hemorrhage. W. J. May.
59 Some Painful Conditions of the Feet. S. C. Baldwin.
60 The Measurements of the Trigone. George S. Whiteside.

The Mobile Medical and Surgical Journal.

October.

61 The Physiological Action and Morbid Effects of the Cold Tar Products, and the Contrast Action of Cold in Fever. F. W. Galloway.
62 The Early Recognition and Essential Features of the Treatment of Pulmonary Tuberculosis. C. A. Mohr.
63 Report of a Case of Enlarged Spleen Successfully Treated with Adrenalin Chlorid. J. B. Tarry.

Southern California Practitioner, Los Angeles.

November.

64 European Sanitation Observations. R. L. Wilbur.
65 A Surgical Vacation. W. W. Beckett.
66 Exstrophy, Pregnancy, Delivery. R. F. Clark.
67 Remarks on Anesthol. J. L. Hagadorn.
68 Medical Inspection of Schools. E. von Adelung.

The Texas Medical Journal, Austin.

November.

69 Notes on Pernicious Malarial Fever. J. D. Jordan.
70 Prohibition—Its Definition, Object, Feasibility and Consequences, with Other Considerations of the Subject, from the Standpoint of a Physician. C. H. Wilkinson.

The Old Dominion Journal, Richmond.

November.

71 The Theories of Serum Therapy. C. R. Grandy.
72 Antitoxic Serum Therapy. Sera of Diphtheria, Tetanus, etc. J. S. Davis.
73 Other Sera, Including Those of Typhoid Fever, Cholera, Dysentery and Tuberculosis. E. G. Williams.
74 Organo-Therapy. L. G. Pedigo.

The Medical and Surgical Monitor, Indianapolis.

October-November.

75 Otitic Brain Abscess. Report of Two Cases. Observations Concerning the Disease. G. F. Keiper.
76 Torsion of the Pedicle in Ovarian Cysts. M. F. Porter.
77 Corneal Ulcers—A Clinical Lecture. F. C. Heath.
78 The Cure of Chronic Discharging Ears. J. F. Barnhill.
79 A Case of Spleno-Medullary Leukemia Cured by the X-ray. T. B. Eastman.
80 Pneumonia. C. R. Sowder.
81 Case Reports. J. R. Eastman.

The Kansas City Medical Record.

November.

82 Special Topography of Ureter and Right Colon. Hepatic Flexure and Transverse Colon. B. Robinson.
83 Borderland of Consumption. P. Paquin.

The Carolina Medical Journal, Charlotte.

November.

84 Surgery and Gynecology in Chicago. H. A. Royster.
85 Intestinal Perforation in Typhoid Fever. H. M. Taylor.
86 Postoperative Femoral Thrombo-Phlebitis. L. C. Bosher.
87 A Few Histories from My Case Book. W. H. Wakefield.

Journal of Eye, Ear and Throat Diseases, Baltimore.

September-October.

88 A Case of Retinitis Proliferans. J. J. Carroll.
89 Interstitial Keratitis. R. S. Lamb.
90 Branchial Cleft Cyst. E. R. Russell.

The Vermont Medical Monthly, Burlington.

October.

91 Some Reasons for the Establishment of a State Sanatorium for Consumptives in Vermont. S. A. Knopf.

92 Tuberculosis—Its Prevention. H. L. Keith.
93 Tuberculosis and the Sanatorium. W. N. Bryant.
94 The Conquest of Tuberculosis in Vermont. H. E. Lewis.

Dominion Medical Monthly, Toronto.

November.

95 Address on Opening of Medical Session, Toronto University, Oct. 3, 1904. J. A. Temple.
96 Address in Gynecology. The Surgical Treatment of Complete Descent of the Uterus. E. C. Dudley.
97 Some Cases Illustrating Difficulties in the Diagnosis and Treatment of Tumors. Wm. Oldright.
98 The Vomiting of Pregnancy. W. E. Burnham.
99 Address, Canadian Medical Association. J. C. Davie.

American Practitioner and News, Louisville.

November 15.

100 The Ophthalmoscope in Diagnosis. Samuel G. Dabney.
101 Treatment of Chronic Constipation. Hubert Richardson.
102 The Laws of Heredity. Maurice Bell.

Journal of Comparative Neurology and Psychology, Granville, Ohio.

November.

103 The Behavior of Paramecium. Additional Features and General Relations. H. S. Jennings.

Mobile Medical and Surgical Journal.

November.

104 Intestinal Perforation in Typhoid Fever. Hugh M. Taylor.
105 Postoperative Femoral Thrombo-phlebitis. Lewis C. Bosher.
106 Eyestrain. Clarence Porter Jones.
107 A Report of the Surgical Use of the *X*-ray. A. L. Gray.
108 The Importance of Urinary Examination. B. L. Taliaferro.
109 Treatment of Chronic Ulcers of the Leg. O. F. Blankingship.

Washington Medical Annals, Washington, D. C.

November.

110 The Prevalence of Tuberculosis. W. C. Woodward.
111 The Prevention of Tuberculosis. D. Percy Hickling.
112 The Climatic Treatment of Pulmonary Tuberculosis. A. F. A. King.
113 The Surgery of Tuberculosis. W. P. Carr.
114 Sanatorium Treatment. George M. Sternberg.
115 The Applicability of the Greenland Fjords to the Treatment of Tuberculosis. Frederick Sohon.
116 The Medical Treatment of Tuberculosis. Samuel S. Adams.
117 Case of Fibrous Tumor of the Brain. D. P. Hickling.
118 The Early Diagnosis of Pulmonary Tuberculosis. Thomas A. Claytor.
119 Capitatum Secundarium. D. S. Lamb.
120 Acute Mastoiditis and the Mastoid Operation in Children. Walter A. Wells.
121 Case of Cholecystectomy. J. Ford Thompson.
122 Sarcoma of the Orbit, with Report of Cases. E. Oliver Belt.
123 Case of Hysterectomy for Fibroids. J. Ford Thompson.
124 Case of Beri-beri. Joseph S. Wall.
125 Delirium Tremens. Thomas N. Vincent.

Colorado Medicine, Denver.

November.

126 A Review of the Literature of Diabetes Mellitus in Children, with Report of a Case. F. E. Waxham.
127 Duodenal Ulcer Caused by Pressure from Stones in Gall Bladder. G. H. Cattermole.
128 School Sanitation. F. G. Byles.
129 Management of Cataract. Melville Black.
130 Colopexy of the Sigmoid Flexure for Prolapse of the Rectum. Albert L. Bennett.
131 Melanotic Sarcoma of the Liver and Other Viscera. Report of a Case. Crum Epler.
132 Sarcomata of the Back—Cases and Comments. Charles A. Powers.
133 Diphtheria. H. R. Bull.
134 Treatment of Urethral Stricture by Electrolysis. W. W. McEwen.

Journal of Medicine and Science, Portland, Ore.

November.

135 Fracture of the Skull into the Frontal Sinus. C. B. Cotton.
136 Prevention and Cure of Pneumonia. Subcutaneous Injection of Oil in Cure of Tuberculosis. Thomas Basset Keyes.

Merck's Archives, New York.

November.

137 The Teaching and the Text-books of Materia Medica and Therapeutics. John Forrest.
138 An Index of Diseases Alphabetically Arranged, with Their Modern Treatment. G. Bjorkman.

FOREIGN.

Titles marked with an asterisk (*) are abstracted below. Clinical lectures, single case reports and trials of new drugs and artificial foods are omitted unless of exceptional general interest.

British Medical Journal, London.

December 8.

1 Life History of Saprophytic and Parasitic Bacteria and Their Mutual Relation. E. Klein.
2 *Micrococcus Rheumaticus; Its Cultural and Other Characteristics. James M. Beattie.
3 *Afebrile Enteric Fever. George Jubb.
4 Case of Congenital Absence of Continuity Between the Large and Small Intestines. C. H. Souter.
5 *Infant Mortality: Its Causes and Prevention. George C. H. Fulton.

2. **Micrococcus Rheumaticus.**—Beattie confirms the results obtained by Beaton and Walker with reference to the etiologic relationship of this organism to rheumatism. One of the organisms with which he worked was obtained from the synovial membrane of a girl with acute rheumatism and from the vegetations of an endocarditis in a rabbit. Intravenous injections in animals produced endocarditis, polyarthritis and chorea. Subcutaneous injections, even in large doses, were not followed by a suppuration. He believes that there is ground for but one conclusion, that this *Micrococcus rheumaticus* is a special organism and is causal in acute rheumatism.

3. **Afebrile Typhoid.**—Jubb based his diagnosis of this case entirely on the serum reaction. Without it, he says, there would have been some hesitation in confining the patient to bed and a milk diet for a prolonged period. There was no disturbance of the temperature until a complication took place—thrombosis of the left femoral vein.

5. **Infant Mortality.**—Fulton directs attention to the influence on infant mortality of premature birth, hereditary tendencies, inexperience and neglect of the mother, industrial conditions, social position, improper food and method of feeding, density of population and illegitimacy. He urges the district and municipal authorities to carry out fully the power they possess relating to cows, cowsheds and milk shops, so that the milk may be good; that printed instructions be handed to parents when the birth of a child is registered, containing advice on simple methods of rearing infants, great stress being placed on breast feeding, and by appointing lady inspectors or visitors in every town. He urges the need of teaching hygiene in public schools and of educating future mothers to a keener sense of their duty to their own children and to the state.

The Lancet, London.

December 3.

6 *Treatment of Cancer. A. W. Mayo Robson.
7 The Progressive Evolution of the Visual Cortex in Mammalia. F. W. Mott.
8 Case of Neurofibromatosis, Sarcoma and Death. W. G. Richardson.
9 Case of Perforative Gastric Ulcer Successfully Treated by Operation 52 Hours After Perforation Took Place. T. Jason Wood.
10 Notes on a Few Cases of Trypanosomiasis in Man. G. C. Chatterjee.

6. **Treatment of Cancer.**—In this paper Robson reviews the entire subject of cancer, the infectivity of cancer and the preventive treatment of scrotal epithelioma, precancerous conditions of the skin, mammary glands, stomach, pelvic organs of women, intestines, and the radical treatment of all forms of cancer. Speaking of cancer of the breast, Robson gives the following brief account of all the operations for this form of cancer which he has done in private. They number 62; three alive and well twelve, ten and nine years respectively after operation; 2 eight years after operation; one each seven and a half and seven years after operation; 3 after six and a half years; one after six; 2 after four; one after three; 3 after two and a half; one after two, and 2 after one and a half years. One lived twenty years and died from chronic bronchitis. Four were without recurrence and died from various causes (meningitis, phthisis, enteric fever, apoplexy), from six months to two years after operation. Eight cases can not be traced. Twenty-nine cases had a recurrence of the disease in from four months to six years after operation; the greatest number, 13, in the second six months; in 8 it was over three years after operation. Of 161 patients admitted to the clinic with operable primary tumors of the breast on which complete operations were performed, between 1889 and 1899, in 1902 60 patients were living and cured; 7 had lived over three years and died from other causes, and 2 had died from other causes within the three years' limit, the necropsy showing no recurrence. This gives 69 cases positively cured. Of the whole number, 161, 83 survived the three years' limit. During thirteen years 305 patients with primary and 38 with secondary tumors were admitted to the clinic, and of these 83 were inoperable. Of 3 cases of the stomach, one, a man aged 42 years, from whom Robson removed the whole stomach except a small portion of the dome and the cardiac orifice, is robust and well four years after operation. A second case, a

woman, aged 54 years, on whom a partial gastrectomy was performed, at the same time as removal of the gall bladder, both organs being cancerous, is well in the fifth year after operation. A woman, aged 50 years, is well nearly four years after the removal of the center of a cancerous hour-glass stomach, the proximal and distal healthy portions having been joined over a decalcified bone bobbin. One case of cancer of the tongue is well seven years after operation, another five years and others over three years, and in all these cases very good power of speech is retained. Of 21 operations for cancer of the bowel done in private there were 17 recoveries. Of these one is alive and well ten years after excision of the sigmoid flexure; one after four and a half years; 3 after three and a half years; 2 after three years, and one after one year. Others lived, one for three years; 3 for two years, and 5 for lesser periods and died from recurrence. One patient is living and well, with good control of the bowel, from whom Robson removed a cancer of the rectum by proctectomy twelve years ago; another after eight years, and others are well and enjoying life several years after operation. Of 12 cases of cancer of the gall bladder and liver, 10 recovered from the operation, 5 being alive at five and a half, 5 four and a half, four, and one and a quarter years after operation. Of 26 cases of cancer of the uterus operated on in private, 12 were total hysterectomies without a death, 5 of the patients being alive and well from five to eight and a half years after operation. Fourteen cases were very free supravaginal amputations of the cervix without a death, 5 cases being alive and well six, nine, ten, ten and a half and eleven and a half years after operation. One lived for five years and died from heart disease, without recurrence of the cancer. One lived four years and recurred, and five lived one year or less and recurred. Robson emphasizes the value of early diagnosis and early radical operative interference, and gives a place to palliative operations.

Journal of the Royal Army Medical Corps, London.

October.

11 Report of Enteric Fever Cases Admitted Into the Medical Division of No. 7 General Hospital, Pretoria. R. C. Cottell.
12 Report of an Outbreak of Epidemic Disease Occurring Among Bethune's Column at Stanger, Natal, October, 1901. W. W. O. Beveridge.
13 *The Treatment of Malarial Fever by Injections of Quinin. C. M. Fleury.
14 Enlargement of the Spleen in Lower Bengal. J. McKenzie.
15 Curious Habit of the African Cobra (Naga Haje). C. R. Bartlett.
16 Rapid Ambulance for Mounted Troops. W. Merchant.
17 A Visit to Leysin, Switzerland. H. R. Whitehead.
18 The Southern Soudan—Its Climates and Diseases. W. Bray.
19 Travel in Somaliland. J. D. Edye.
20 Gunshot Wounds Implicating the Larger Joints, Especially the Knee and Shoulder. G. A. Moore.
21 The Expansion of the Royal Army Medical Corps in Time of War. William Coates.

November.

22 *The Nasal Treatment of Asthma. Alexander Francis.
23 The Piroplasma Bigeminum of the Immune Ox. A. Theiler.
24 Notes on the Sudanese Tribes of the White Nile. S. L. Cummins.
25 The Working of an Out-patient Department in Military Hospitals. F. E. Gunter.
26 Hints on Service in Ceylon. F. W. Begbie.
27 The Water Supply and Sanitation of Camps in India. H. S. McGill.
28 The Causation of Enteric Fever at Quetta, with Special Reference to Camp Sanitation. J. Battersby.
29 An Undescribed Eruptive Fever. W. Mould.
30 With the Sikkim Tibet Mission Force. C. W. Mainprise.

13. Quinin Injections in Malaria.—Because a number of men failed to react to quinin when administered by the mouth, Fleury resorted to hypodermic injection of acid quinin hydrochlorid of the B. P., as this preparation of quinin is readily soluble in distilled water when warm, and one minim of distilled water takes up one grain of the drug. It does not cause any irritation. Arguing on the assumption that the nearer to the spleen the injection is made the better the result, he determined to inject deep into the structures below the rib, just behind the midaxillary line on the left side, so placing the injection as near to the spleen as is consistent with safety. The parts were carefully washed and rendered as aspetic as possible. A 10-minim syringe with a fairly long and fine needle was used. The solution to be injected was prepared at the time, or not more than three days beforehand, the strength of the solution being such that the syringe when filled with 10 minims contained eight grains of quinin. The solution was always injected warm. The puncture wound was at once sealed with collodion and gauze on the needle being withdrawn. In some of the more severe cases Fleury found it necessary to repeat the injection in twenty-four hours, and in one or two cases he gave 16 grains at one injection. The results were, in practically all cases, most striking. Where no reaction followed the injection it was found subsequently that the patient was suffering from some disease other than malaria. Eighteen cases are cited illustrating the value of this method of treatment.

22. Nasal Treatment of Asthma.—An experience obtained from treating over 400 cases of various kinds of asthma is responsible for the opinion expressed by Francis that it is those asthmatics who present no gross nasal lesions and no subjective nasal symptoms, that give the best hope of affording relief by intranasal treatment. Of 402 recorded cases only 14 obtained no relief, and of these 3 suffered from polypi and 2 from such pronounced deflections of the septum that it was impossible to apply the galvanocautery without doing operations which were declined. Only eight cases that presented no gross nasal lesions, out of 346 cases treated, obtained no relief, and of these 3 were seen by Francis only three times and one four times. Of the remaining 4 cases, one was a pronounced morphinomaniac. In addition to these 14 known failures there are 17 cases where he was unable to obtain any record of the result, and a number of others that were completely relieved or greatly improved when lost sight of. From the experiences obtained in treating these cases Francis draws the following conclusions: 1. That asthma is due to reflex spasm of the bronchial tubes. 2. That the irritation may originate in the nose, as may be inferred from (a) the intimate association between hay fever and asthma; (b) the very common record of excessive sneezing at some period in the previous history of an asthmatic patient; (c) the not infrequent alteration between asthma and sneezing. 3. That asthma is not directly due to any mechanical obstruction of the nasal passages, and is not commonly caused by any gross nasal lesions. 4. That some part of the nasal apparatus has a controlling influence on the respiratory center; or there is in the nose, as it were, an agency through which the afferent impulses must pass.

[The author fails to describe his method of treatment, but it may be inferred from a report of several cases treated, that it consists of cauterization of the nasal mucous membrane with the galvanocautery.—ED.]

Semaine Médicale, Paris.

31 (XXIV, No. 47.) *Le rôle pathologique des poisons de l'intestin. Charrin and Le Play.
32 Les fausses couches tubaires (tubal abortions). F. Lejars.

31. Pathologic Role of Intestinal Poisons.—The researches outlined here enlarge the conceptions of the pathogenic importance of intestinal poisons. Many of the experiences described were merely the production in animals of what is observed in the clinic. An entire series of deformities were engendered in very young animals. One phenomenon noted was that of autofunction, that is, that a substance derived from a given organ stimulates that organ to extra activity. Urine, for instance, has a diuretic action; thyroid extract stimulates the thyroid gland, and injection of substances derived from the wall of the ileum caused manifest hyperemia of the intestinal wall, exaggerated secretion and nuclear karyolysis. The experiments reported demonstrate that the alimentary canal normally contains innumerable poisons, including toxic substances, such as the diastases, which are required for the nutritive processes. They have further established that frequently a disease is due to the disorganization of its defenses rather than to the intrusion of any special pathologic agent. In therapeutics, while it is necessary to attack the enemy, yet in many cases it is important that more attention should be paid to strengthening the ramparts. The normal organic products may become morbific under certain circumstances, and some of these morbific elements are merely physiologic digestive secretions.

Berliner klinische Wochenschrift, Berlin.

33 (XLI, No. 46.) *Die Behandlung des Diabetes. E. de Renzi.
34 Zur Farbentransformationstherapie. (Sensibilisirung; Fluorescenz.) G. Holzknecht.
35 *Ueber Atropin-Vergiftung (intoxication). B. Holz.
36 Meat Inspection.—Das Reichs Fleischbeschaugesetz in Bezug auf die Tuberculose, nebst einigen Bemerkungen über die Ausführung der Fleischbeschau. M. Westenhoeffer. (Commenced in No. 45.)
37 (No. 47.) *Treatment of Lupus by General Practitioner.—Die Behandlung des Lupus durch den praktischen Arzt nebst histologischen Untersuchungen. Dreuw.
38 Physiologische und therapeutische Erfahrungen mit dem organischen Phosphor, insbesondere mit "Phytin." J. Loewenheim.
39 *Seltene Formen und Lieblingssitze des rheumatischen Processes. J. Schreiber.
40 Reduction of Obesity and Albumin in Forced Feeding.—Entfettung und Eiweissmast. K. Bornstein. (Commenced in No. 46.) Reply. A. Albu.

33. Treatment of Diabetes.—De Renzi has been treating diabetes for thirty-four years with a green vegetable diet. He thinks that this is not merely a symptomatic but a radical cure. The carbohydrates in green vegetables are well tolerated by diabetics. The power of assimilation is exaggerated in them, contrary to what is observed in tuberculosis. An amount of calories inadequate for a healthy subject amply suffices for a diabetic. His ration is five portions of green vegetables; five portions, that is, about 300 gm. of meat, five eggs and a pint of wine, forming a total of 2,104 calories. The only drug of any use in diabetes is sodium bicarbonate. He gives it in large doses and remarks on the strange tolerance for it. It neutralizes the beta-oxybutyric acid, while it improves the general condition and the glycosuria decreases. One diabetic woman took 40 gm. a day, fractioned, deriving astonishing benefit from it during the two years she was under observation. When the dose was reduced the improvement declined with it. He considers electricity harmful in diabetes.

35. Atropin Intoxication.—A woman mistook the bottles and gave her child a teaspoonful of an atropin mixture, ordered for instillation in the eye, and instilled in the eye a few drops of an iron syrup. In two hours the symptoms of severe atropin intoxication were pronounced. Holz injected 5 mg. of morphin, evacuated the intestinal gases through a stomach tube, and stimulated intestinal peristalsis with vinegar enemas. The soothing action of the morphin was apparent at once, and after a second injection in four hours, all danger was past. The antagonism between atropin and morphin and morphin and atropin is now established. They are not chemical antidotes in the chemical sense, but the morphin stimulates the nerves paralyzed by the atropin.

37. Treatment of Lupus by the Non-Specialist.—Dreuw announces that he has worked out a simple, inexpensive technic which is proving an effectual cure for lupus and can be applied by any practitioner. It consists in first freezing the lupus patch with ethyl chlorid and then rubbing into it crude hydrochloric acid saturated with free chlorin. He has thus treated 25 patients and the results, he thinks, justify the statement that any practitioner can now successfully treat lupus. He rubs the acid into the patch with a cotton-wound toothpick. In contact with tuberculous or lupous tissue, it induces immediately such an immigration of leucocytes that it is almost impossible to detect the tuberculous or lupous character of the tissue afterward. This immigration is much more extensive than has been observed hitherto under any circumstances. Even long-established cases of lupus yield to this treatment, and in three patients treated more than a year ago there has been no tendency to recurrence. The treatment is equally effectual for tuberculous abscesses and fistulas, applied under narcosis. Phototherapy was not used in any of his cases, but he thinks that a combination of the two methods might be advisable.

39. Rare Localizations of Rheumatic Processes.—Schreiber has observed rheumatic processes in the periosteum of the ribs, costal arch, manubrium and long bones, which had been erroneously diagnosed by others. Also in the muscles of mastication, in the diaphragm and in the ligaments and muscles at the outlet of the pelvis. He gives the list of the 13 points for which rheumatism has a special predilection, and emphasizes that movement is the best treatment for rheumatism. If a muscle is rheumatic and painful, use it and the rheumatic process will be aborted. Chilling after being overheated is the principal cause of rheumatism, not cold, even intense cold. Treatment of chronic rheumatism should be by exercise and movements, active and passive.

Deutsche medicinische Wochenschrift, Berlin and Leipsic.

41 (XXX, No. 48.) *Portable Mercury Manometer.—Ueber kompendiöse, leicht transportable Taschenquecksilbermanometer zu klinischen Zwecken, speziell zur Sphygmomanometrie. Nebst Bemerkungen über eine Verbesserung der Riva-Rocci'schen Manschette. H. Sahli (Berne).
42 Diagnose und Behandlung der Frühstadien der Tabes (early stages). F. Schultze.
43 *Einige Bemerkungen zur Behandlung der Hyperacidität des Magensaftes (of gastric juice). W. Ebstein.
44 *Zur Kenntnis der Jodwirkung bei Arteriosclerose (action of iodin). Romberg and others.
45 *Zur Diagnose chronischer Entzündungen und Eiterungen, besonders an den Knochen (Caries oder Necrose) (of bones). Graser.
46 *Treatment of Sterility in Women.—Ueber Behandlung und Heilungsaussichten der Sterilität bei der Frau. E. Bumm.
47 *Der künstliche Abort (artificial abortion). H. Fritsch.
48 *Die Behandlung der Katarrhe der weiblichen Genitalorgane (of female genitalia). A. Dührssen.
49 Treatment of Opacity of Cornea and Lens.—Ueber Sehstörungen bei Hornhaut- und Linsentrübungen und ihre Behandlung. H. Schmidt-Rimpler.
50 *Deafmutism.—Taubstummheit und Taubstummenunterricht. Bezold.
51 Ueber Phimosis acquisita. Rille.

41. Pocket Mercury Manometer.—Sahli's manometer consists in a U-shaped glass tube to hold the mercury, with a bulb at each end. Above the bulb the right end of the tube bends at a right angle to connect with the rubber tube, a stopcock being interposed to prevent spilling of the mercury when the tube is disconnected. In the other end of the U tube another glass tube is inserted and stands upright, forming a vertical continuation of the left end of the U. This second tube is graduated in mm. and can measure a pressure of 260 mm. The U is fastened to a small board with standard which lies flat in the case when not in use and, when wanted, fits into a socket in the case and thus stands upright and firm. The manometer thus ready for use can be connected with the Riva-Rocci, Gaertner or Basch-Potain sphygmograph or tonometer. These instruments thus become pocket appliances for bedside use.

43. Treatment of Hyperacidity.—Ebstein reiterates his former announcements in regard to the remarkable efficacy of large oil enemas for the cure of chronic constipation, and also of hyperacidity accompanied by chronic constipation. He meets this combination very frequently, especially in young women. The total acidity in the healthy stomach averages about 50. In the cases he reports the acidity ranged from 60 to 150, and the constipation was extreme. A large oil enema every day for one to three weeks restored conditions to normal in every instance, and the patients gained rapidly in weight. Ordinary treatment of the constipation does not reach and expel old accumulations of feces lurking in out-of-the-way nooks. These lumps constantly grow in size, like a snowball, as new fecal matter arrives. In case of moderate constipation purgatives may expel them, but if this fails the subject is ready for the oil. The aim is to train the intestines to do their full functional duty, and consequently treatment should be kept up, after the constipation is relieved, until the bowels are functioning normally. If this is not accomplished the hyperacidity is liable to return sooner or later. Food rich in cellulose stimulates the intestines at first, but they soon become accustomed to this stimulus and fail to react to it. When this occurs the cellulose accumulates and clogs the intestines. They expel it occasionally in an attack of diarrhea, but the chronic constipation persists.

44. Action of Iodids in Arteriosclerosis.—It is announced from Romberg's clinic at Tübingen that the blood becomes less viscous under the influence of the administration of iodids. This fact supplies the explanation for the benefits derived from them in arteriosclerosis. The obstacles encountered by the blood are overcome by the blood's becoming less viscous. Moderate doses are enough, from .3 to .5 gm. potassium or sodium iodid three times a day, avoiding acid foods and drinks and taking alkalies with the iodids. In case the stomach re-

bels, iodipin can be injected subcutaneously. Two cases of cerebral arteriosclerosis are reported in which remarkable improvement was noted under potassium iodid, .9 gm. a day for thirteen days; the blood findings in regard to the viscosity kept pace with the improvement noted. Romberg thinks that iodin is liable to be directly harmful in cases of arteriosclerotic contracted kidney with cardial asthma and in goiter accompanied by cardiac disturbances. The action of the iodin salts is strikingly favorable in incipient cerebral arteriosclerosis, in moderately severe angina pectoris, in case of moderate heart weakness with dyspnea after exertion, and occasionally in cardial asthma and intermittent limping.

45. **Diagnosis of Chronic Inflammations and Suppurations in Bones.**—In this postgraduate lecture Graser reviews the data on which the diagnosis can be based, especially the differentiation of a tuberculous process and of the tardy processes resulting from ostitis, tuberculosis, syphilis or actinomycosis.

46. **Treatment of Sterility in Women.**—Bumm believes that about two-thirds of the cases of sterility in women are due to defective development of the genitalia, the other third is acquired, generally the result of gonorrheal infection. The fact that nearly a fifth of the women delivered in the maternity again and again are suffering from chronic gonorrhea shows that gonorrhea can not be the sole cause of sterility. The internal genitalia may be infantile when the external are fully developed and the subjects robust. One or more parts of the internal genital organs may be defective while the rest are well developed. When the uterus is atrophied, the menses scanty, the prospects of a cure are very small. The only means of correcting the condition are by local application of the constant current, with gentle massage of the uterus. In 12 cases thus treated dysmenorrhea was cured in all, menstruation was regulated, and in 5 the uterus increased in size and conception followed in 3. In 7 the uterus showed no increase in size, and the favorable effect on the menstruation was the only result obtained. He describes the various measures indicated when the uterus appears to be normal and menstruation is regular and abundant, showing that the source of the sterility must be sought elsewhere. Four out of 7 women with callous alterations in the mucosa of the cervix were cured by systematic dilatation of the latter. The prospects in case of gonorrhea depend on the stage. If still incipient the aim should be to prevent its gaining access to the tubes. Hence all intrauterine intervention is contraindicated. Gonorrheal catarrh of the cervix is tenacious and prevents conception. There is only one means of curing it, namely, to slit the os and the portio, to expose the mucosa and drain. Gonorrheal infection of the uterus usually heals spontaneously. Even in case the tubes are involved, six or eight weeks in bed with ice and afterward hot applications, are liable to lead to almost complete restitution, without permanent occlusion of the tubes. In case the latter has occurred, massage may prove useful, and, as a last resort, removal of the diseased adnexa on one side and freeing of the others from adhesions.

47. **Artificial Abortion.**—Fritsch remarks that the law in Germany condemns any one who artificially interrupts a pregnancy. No exception is made in any instance. And yet if a physician were to neglect to induce abortion when it was urgently indicated he would be liable to condemnation on account of professional neglect. The results in the latter case would be even more disastrous, as both mother and child are lost. He does not approve of inducing abortion in phthisis, although the physician's hand may be forced by threatening complications. In case of incoercible vomiting a decision is often difficult. In one case a woman vomited constantly night and day and her weight dropped from 135 to 98 pounds. After failure of every known measure abortion was induced and the patient then triumphantly informed the physician that she had starved herself and induced the vomiting artificially in order to be relieved of an unwelcome pregnancy. In another case a woman falsified a letter received from a physician, altering it into an approval of artificial abortion in her case, and the family physician acted on the supposed advice. Carcinoma of uterus or vagina is not an indication for abortion. In case the latter is undertaken for any cause, at least three days should be devoted to it. He describes his technic and states that it is not dangerous and the loss of blood is not excessive. The completely empty uterus does not bleed, especially when large doses of ergot are given in the after-treatment.

48. **Treatment of Catarrhal Gynecologic Affections.**—Dührssen insists on the importance of determining the exact source of the catarrhal secretion. It may be the first sign of cancer. He adds that catarrhal affections of the uterus are not always due to gonorrheal, tuberculous or septic affections, but may be the result of mere hyperplasia of the uterine mucosa. This hyperplasia may be due to disturbances in the circulation, displacements, nervous influences, or be a reflex from chronic oöphoritis. By improving the circulation, restoring tone to the nervous system, etc., this hyperplasia may be restored to normal without direct intervention.

50. **Deafmutism.**—Bezold thinks that in rather more than half of all cases of deafmutism the condition is acquired, and generally during the first and second years of life. He has encountered a family recently in which two children were deaf mutes, as also both parents and a common great grandfather. He warns against consanguineous marriages between deaf mutes, although deaf mutes may intermarry under other circumstances. In his personal experience, 74 out of 233 cases of acquired deafmutism were consecutive to cerebrospinal meningitis. In 47 other cases there was precedent cerebral typhoid. Some brain process was noted in the antecedents of 51.9 per cent.; scarlet fever in 18 per cent. In 4 cases the deafmutism was referred to mumps; in 13 to inherited syphilis; in 6.4 per cent. to otitis media, and in 3 per cent. to a fall on the head. He found traces of hearing in all but 79 out of 276 deaf mutes examined. In cultivating this remnant of hearing a hand mirror is a great assistance. The subject watches in the mirror the lips of the person speaking directly into his ear. It is necessary that this training should be individual, not in class, especially not in a class with the totally deaf. By this individual instruction the deaf mute learns to speak with natural intonation.

Münchener medicinische Wochenschrift.

52 (LI, No. 45.) *Behavior of Blood Corpuscles in Infections, etc.—Experimentelle Untersuchungen zum Verhalten der Blutkörperchen bei Infektions- und Intoxikations Versuchen, sowie nach Einverleibung von Eiweisskörpern und Heilseris. J. Arneth.

53 Ueber Pericystitis nach latenter Perityphlitis. K. Walko.

54 *Intravenöse Salizyl-Behandlung und rheumatische Affektionen. F. Köhler.

55 Fall von Lähmung des rechten Obliquus superior mit kontralateralen Paraesthesien der linken Gesichtshälfte, erworbenem zerebralen Nystagmus und Schwindelerscheinungen. Ausgang in Heilung (paralysis and vertigo). Vollert.

56 *Ueber akute Magen-Dilatation (of stomach). E. Hoffman.

57 *Ueber Heftpflasterverbande bei Ulcus cruris (adhesive plaster dressings). C. Philip.

58 Origin and Fate of Leucocytes.—Der Ursprung und die Schicksale der farblösen Blutzellen. M. Askanazy. (Commenced in No. 44.)

59 Ueber Syphilis maligna mit einem Beitrag zur Kasuistik derselben. Weik. (Commenced in No. 44.)

52. **Behavior of Red Corpuscles in Infections, Etc.**—Arneth's experimental research has confirmed the existence in animals of the same phenomena as occur in man in infections, intoxications, etc., namely, a series of changes in the blood corpuscles, showing that they become used up in the course of the morbid process. The eosinophiles in the rabbit behave the same as the neutrophiles in man.

54. **Intravenous Salicylic Medication and Rheumatic Affections.**—Behr is delighted with the results obtained with intravenous injection of the salicylates, according to Mendel's technic. It is most effectual in acute cases of rheumatic affections, and does not induce sweating as when administered by other routes. Different individuals respond differently to the injections. He cites a few cases from his experience. In one an acute articular rheumatism was aborted with a single injection, as also a case of acute lumbago. His subjects were all tuberculous, with the exception of the gardener's lumbago. He also advocates external application of the salicylates with massage of the part.

56. **Acute Dilatation of the Stomach.**—Hofmann reports a case which demonstrates that it is possible for acute, fatal dilatation of the stomach to occur without any previous appreciable stomach trouble. Also that in the lack of any preceding history of the case, acute dilatation of the stomach may lead to errors in diagnosis which may entail the most serious consequences. When uncontrollable vomiting develops, associated with circumscribed dullness predominating in the left half of the abdomen, the possibility of acute dilatation should be borne in mind and the stomach should be emptied with the stomach tube and rinsed. Acute dilatation of the stomach seems to occur preferably in young subjects. In the case described the patient was a young man suffering from extreme thirst, vomiting constantly dark brown matter, almost moribund. The presumptive diagnosis was partial peritonitis with encapsulated exudate, but at the immediate laparotomy the stomach was found distended until it measured 18x25x34 cm. Six quarts of fluid were evacuated, containing large undigested pieces of cucumbers. The other organs appeared to be normal. Death soon followed and postmortem examination showed that the head of the pancreas was enlarged and abnormally hard, with multiple islands of necrosis. Unsuspected atony of the stomach had probably existed for some time, and immoderate ingestion of cucumbers had induced the acute dilatation.

57. **Adhesive Plaster Dressings for Leg Ulcers.**—Philip writes from Unna's clinic to recommend the use of adhesive plaster which has a part left free from the adhesive substance. This free part is placed over the ulcer. It allows the secretions to percolate through it while the adhesive substance on the rest of the plaster holds it firm. Such a dressing can be applied in a few minutes and is not changed for three to six days. It is being used extensively even for ulcers as large as 5 to 12 cm., substituting the "zinc glue dressing" formerly used.

Wiener klinische Rundschau, Vienna.

Last indexed page 1096.

60 (XVIII. No. 36.) **Beobachtungen** über den Temperatur-Verlauf der Tuberkulose und die Verwertung desselben bei der Prognose. J. Szaboky.
61 (No. 37.) Zur Pathogenese der Menschentuberkulose nach von Behring. F. Köhler.
62 (No. 39.) Die Typhusendemie in der königl. böhm. Landes-Gebär- und Findelanstalt im Jahre 1902 und 1904. (Commenced in No. 37.) J. Dvorak.
63 Die Pathogenese der Gallen-Steine vom klinischen Standpunkte. (Commenced in No. 38.) L. Naxera.

Wiener klinische Wochenschrift, Vienna.

Last indexed page 1269.

64 (XVII. No. 38.) *Zur Sozial-Hygiene der Tuberkulose. F. Hueppe.
65 Flagellaten im Magen (in stomach). E. Zabel.
66 *Zur Kasuistik der Spondylitis tuberculosa. A. Jehle.
67 Lupus Institute at Vienna.—Die "Heilstatte für Lupus Kranke." E. Lang.
68 (No. 39.) *Foundation and Aims of Pediatrics.—Die Grundlage und Ziele der modernen Kinderheilkunde. T. Escherich.
69 *Erfahrungen über Harn-Segregation (of urine). R. Lichtenstern.
70 *Zur Tuberkulose des Zentral-Nerven-Systems. H. Raubischek.
71 Ein neuer Verband bei Ulcus cruris (ectogan dressing). S. Schwarz.
72 (No. 40.) *Action of Radium Rays on Nervous System.—Die Wirkungen der Radiumbestrahlung auf das Nervensystem. H. Obersteiner.
73 *Die Erfolge der Radikal-Operation bei Crural-Hernien nach der Methode von F. Salzer. H. Riedl (Linz).
74 Zur Kenntnis des Diphtherie-Antitoxins und seiner Beziehungen zum Toxin. E. P. Pick und J. Schwoner.
75 Ueber hämolytische Wirkungen des Froschserums (frog serum). E. Lazar.
76 (No. 41.) *Edema in Nephritis.—Die Wassersucht der Nierenkranken. G. Kövesi.
77 Iodin Springs.—Ueber die Jodquellen in Bad Hall. J. Haldenthaller.
78 Ueber eingreifende Ohr-Operationen in Lokal änasthesie (local anesthesia in surgery of the ear). H. Neumann.
79 Sabo medicatus **als innerliches** Medikament und seine erweisbaren Wirkungen. Oefele.
80 *Behandlung der Prostata-Hypertrophie bei inkompletter Harn-Retention mit Blasen-Dilatation. G. Nicolich.
81 (No. 42.) Zur Kenntnis der Malaria. R. Liehm.
82 *Diagnostic Value of Blood Count.—Zur Frage der Verwertung der Blutkörperchenzählung für die Diagnostik und Indikationsstellung bei gynäkologischen Erkrankungen. F. Neumann.
83 (No. 43.) *Zur Inhalations-Therapie. R. v. Seiller.
84 Ueber die Verwandtschaft der verschiedenen Dysenterie-Stämme (relationship). P. Eisenberg.
85 Pigmentation of Lids New Symptom of Exophthalmic Goiter.—Ein bisher nicht beachtetes Symptom der Basedowschen Krankheit. S. Jellinek.
86 Zur Reaktion des normalen Prostata-Sekrets. F. Schultz.
87 (No. 44.) *Nervous and Mental Affections at Puberty.—Ueber Nerven- und Geisteserkrankungen in der Zeit der Geschlechtsreife. G. Anton.
88 *Therapeutische Versuche mit Radium und sensibilisierenden Substanzen. R. Polland.
89 Origin of Mononuclears in Inflammations.—Ueber die Herkunft der einkernigen Exsudat-Zellen bei Entzündungen. G. Schwarz.
90 Zur Symptomatologie der Venen-Thrombose. F. Forster.
91 Ueber neuere Vorkehrungen zur Bekampfung der Tuberkulose (war against tuberculosis). L. Teleky.
92 (No. 45.) *Experimentelles über die Obstipation. K. Glaessner.
93 History of Medicine in the Curriculum.—Die Geschichte der Medizin als akademischer Lehrgegenstand. M. Neuburger.
94 Experiences with Artificial Delivery.—Einleitung der künstlichen Frühgeburt bezw. des Abortus in den Jahren 1898 bis 1. Juli 1904. E. Gallatia (Laibach).
95 (No. 46.) *Ueber Spinalanalgesie. M. Silbermark.
96 Die hämolytische Wirkung des Sublimats. L. Detre und J. Sellei. (Commenced in No. 45.)
97 (No. 47.) Schwerer Fall von traumatischem Tetanus geheilt durch Dural-Infusion von Behringschem Tetanusserum. J. Gobiet.
98 *Vaccination Under Red Light.—Impfreaktion unter Rotlicht. C. Rosler.

64. **Hygiene of Tuberculosis.**—This article was presented by Hueppe at the English Hygienic Congress last July. He emphasizes the impetus given to a tuberculous process by inhalation of dust, citing the experiences at Vienna, which seems to be the "Windy City" of Europe. During the last decade the deaths from tuberculosis per 10,000 inhabitants were 46.4, in contrast to the 23.1 at Berlin and 17.7 at London. He states that as long ago as 1887 he called attention to the way in which when one disease seems to be diminishing in frequency another may vicariously increase. As the mortality from pulmonary tuberculosis has declined in Prussia, for example, the deaths from other lung affections have increased, raising the total proportion to 49 and to 50.4 for the German empire. By strengthening the resisting powers we not only combat tuberculosis, but all other lung affections. The importance of this, however, does not seem to be realized by the very short-sighted bacteriologic orthodoxy. Social hygiene should combat the three factors of tuberculosis—the predisposition, the germ and the environment—all variable quantities. The semicentennial of the pioneer Brehmer sanatorium assembled numbers of old patients, permanently cured for years, long before the tubercle bacillus had been discovered. He adds that he has succeeded in inducing a hypersensitive reaction in animals, so intense that fatal tuberculosis with infiltration and tuberculization of the tissues occurs in twenty hours, instead of the protracted process hitherto observed. He is confident that this will aid in the study of the various factors of immunization. He has further established that bacteria can remain latent and viable in the interior of the organism for a much longer period than hitherto admitted. Pathogenic bacteria can persist latent a long time even after specific immunization of the organism. The greatest danger for infection and acquirement of the predisposition to tuberculosis lies in the blossoming time of life.

66. **Tuberculous Spondylitis.**—Jehle reports several cases to illustrate the various clinical pictures that may be presented in this disease. It may occur in children in an unrecognized, latent form. In one case a slight deviation of the head to one side was long the only symptom.

68. **Modern Pediatrics.**—This address was read at the St. Louis Congress of Sciences last September. Escherich expatiated on the pathology of the child as it varies at different periods of growth. The first period is distinguished by the intensity of cell proliferation. The skin, mucosæ, organs, etc., are still undeveloped and are easily traversed by germs, so that the newborn infant is peculiarly susceptible to pyogenic and other infections. The high infant mortality is mainly due to the functional weakness of the still imperfectly developed vital organs. The rapid growth of the brain during the first year is frequently accompanied by abnormal sensitiveness of the nervous system. The skin and mucosæ are likewise still extremely sensitive, and the tendency to pyogenic infections still persists. From two to five the pathology is largely the result of defective ossification and of the habit of creeping on the floor and putting things in the mouth. Local and miliary tuberculosis and acute poliomyelitis are peculiarly frequent during this period of growth, and defective development of the

brain becomes apparent. From 6 to puberty the pathology is that of school life, contact infections and traumatic affections; it is possible that the vigorous play of the muscles at this age may set up inflammation of the appendix. Tuberculosis becomes less frequent, but a new, dangerous infectious disease appears, acute articular rheumatism with its sequelæ. The pathology of puberty is generally restricted to females, chlorosis, hysteria, psychoses, heart affections. In other respects the morbidity is that of adults. Study of the pathology of each of these five periods of growth permits intelligent prophylaxis.

69. **Luys' Urine Segregator.**—This little instrument described in THE JOURNAL, XXXIX, page 173, 1902, is highly commended by Lichtenstern, who is using it extensively. The operation or necropsy or the progress of the case has always corroborated its findings. It is a simple, reliable, aseptic and harmless procedure, and affords valuable information. When exact bacteriologic examination is necessary, catheterization of the ureters is sometimes preferable, as the urine in using the separator has to traverse the bladder, and the findings may be thus vitiated.

70. **Tuberculosis of Central Nervous System.**—Raubitschek states that he has been able to discover axis cylinders even in the midst of tuberculous caseous patches. This discovery has been rendered possible by the new Bielschofsky technic. It explains the almost symptomless course of the solitary tubercles in many cases of tuberculous meningitis. It also explains why even large tubercles in the brain never induce focal symptoms to the same extent as tumors of other kinds at the same points.

72. **Action of Radium on Nervous System.**—Obersteiner has been exposing 36 white mice to the action of radium bromid for from one to four days. All exhibited symptoms indicating severe disturbances in the central nervous system, convulsions, paralyses, turning around in a circle, trophic disturbances, such as panophthalmitis or necrosis of nose, ears or extremities. Histologic examination of the nerve tissue showed notable changes and also great disturbances in the circulation, with frequent hemorrhagic foci.

73. **Salzer's Radical Operation for Femoral Hernia.**—Riedl reports the results in 188 cases of femoral hernia treated by Salzer's technic since 1894. All but 46 were women. The proportion of permanent cures is 92.5 per cent. The proportion of permanent cures, after simple herniotomy, was merely 59.4 per cent. of the total 90 cases. The chief feature of the Salzer technic is that the femoral ring is closed with a flap taken from the pectineal fascia. When the detailed description was published in the *Centralbl. f. Chirurgie*, 1899, Brenner reported 91.8 per cent. permanently cured out of 63 patients thus operated on.

76. **Edema in Nephritis.**—Kövesi describes the chain of phenomena resulting in edema in nephritic subjects, and proclaims anew the importance of the dilution test as a means of determining the functional capacity of the kidneys even before edema develops. This test was described in these columns, XXXVIII, page 1338.

80. **Treatment of Hypertrophied Prostate with Incomplete Retention of Urine and with Dilatation of the Bladder.**—Nicolich's unfavorable experiences with the usual methods of treating this condition compelled him to seek a better one for the treatment of a particularly severe case in a man of 67. The bladder reached nearly to the umbilicus and there was nocturnal incontinence. He performed suprapubic cystotomy and excised the middle, obstructing lobe of the prostate through the bladder. He then packed the bladder with gauze. This stretched the walls, arrested hemorrhage from the wound in the prostate, and drained the bladder by absorbing the urine as fast as it entered. He changed the gauze daily, using less and less each time, and removed it entirely on the eighth day. The permanent catheter was not required. Within a month the patient was urinating normally, and the wound was finally closed about the fiftieth day.

82. **Blood Count in Gynecology.**—In the material at Chrobak's clinic leucocytosis of 15,000 almost invariably proved to be a sign of suppuration, although the latter sometimes occurred without it. Even 11,000 to 15,000 were suggestive figures. Extrauterine abortion was generally accompanied by moderate leucocytosis, and acute torsion of a cyst by considerable hyperleucocytosis.

83. **Inhalation in Therapeusis.**—Seiller's experiences were very favorable with various pulmonary affections treated by inhalation of medicated sprays. He found it possible to dispense with all other medication in many cases of bronchitis, bronchial asthma and acute laryngitis. The effect was almost magical in very severe cases of croupous pneumonia with weak heart and distressing dyspnea. The inhalations relieved the symptoms, but did not seem to affect the course of the disease. He gives the particulars of his tests with various drugs.

87. **Nervous and Mental Affections at Puberty.**—Anton has classified 3,720 cases according to age and also according to the first manifestations of the nervous or mental trouble. He further describes the special symptoms of the puberty psychoses, especially what he calls "perseveration" and "never finishing." He comments on the symptoms due to the lack of normal relations between the nervous system, the brain and the rest of the body. He defines hysteria as due to a lack of the normal relations between the dynamics of the cerebrum and the physical body. These relations differ in the child and in the adult. The disturbances of puberty are sometimes the result of injuries to the head, of intoxications from within or without, or of disturbances in the thymus gland. Treatment should aim to prevent degeneration and to promote hygiene. This hygiene should commence before birth and be particularly enforced during school life. Sexual morality is an important hygienic institution for the prevention of nervous and mental pathology. The physician should watch for the appearance of nervous irritability, for the crises in the sexual life and for the periodical fluctuations in the mental and moral spheres. Disturbances during puberty being frequently due to acquired or inherited intoxication and morbid metabolism, Anton sometimes applies energetic diaphoresis. An experience of ten years has more and more confirmed its efficacy. In the stuporous and catatonic forms, systematic saline infusion has frequently proved extremely beneficial. Some patients are cured by a change of climate, especially to the mountains. The life of the neuron axis being a great chain of simple and complex reflexes, it is possible to therapeutically influence the organism by systematically eliciting suitable reflexes. Morbid distress can often be dispelled by application of heat to the back of the neck. Massage of painful nerves in the neck will sometimes banish severe headache. Painful stomach cramps may be cured by a mild steam douche in the umbilical region. The sensation of excessive fatigue may sometimes be dispelled by merely tapping the muscle, or nervous vertigo be relieved by energetic compression of the head. The peculiar reflex connections between the nose and the genitalia are well known. All these reflex phenomena are subject to individual variations, and the physician, by these simple reflexes, is able to influence the nervous system, and should study to utilize this "reflex therapy." He should bear in mind that a family is liable to contain some person who has a nerve-racking influence. Homesickness is another frequently overlooked factor. The task of the physician is to bring the subject into normal relations between mind and body, between psyche and environment. He should not be allowed to yield to the impulse for self-isolation, nor to the influence of stronger morbid wills, nor to companionship with degenerates. A periodical fluctuation of the entire nerve condition is frequently noticeable. Well-chosen work is an important feature of the medical training, but the final occupation should not be selected until after the crisis of puberty is past, as not until then is a final decision possible as to the definite personal equation.

88. **Radium Treatment.**—The conclusions of the research and experience at Kreibich's clinic, Graz, in respect to the therapeutic efficacy of radium, are that its destructive action on the tissues is analogous to that of electric light or sunlight, not

elective for neoplastic tissues and not affecting deep-lying tissues without superficial action. Preliminary injections of eosin do not enhance the effect. The destruction of tissue persists, long after suspension of treatment, and the defects are remarkably slow in healing. Hemangiomata are cured by the radium rays, as the coagulation induced in the blood over the exposed area spreads to the adjoining region and the thrombi become organized. Radium is inconstant in its action, and does not permit of exact dosage. On the other hand, it was found that intracutaneous injection of 1 per 1,000 eosin increased the power of absorption of the skin in respect to direct sunlight. Superficial ulcerations healed under this treatment very rapidly, but lupus did not seem to be affected.

92. **Experimental Study of Obstipation.**—Glaessner resected a long piece of the intestine in dogs, reversed it and sutured it again in place. The feces were not passed along in this stretch of the gut, and severe obstipation was the result. The nitrogenous elements in the urine increased progressively. The ammonia also increased after a defecation, sometimes to double the previous proportion, but sank again to normal after the next, commencing to rise again at once thereafter.

95. **Spinal Analgesia.**—This article describes the experiences with spinal analgesia in 232 cases at Mosetig's clinic, Vienna. It was found efficient for all operations in the groin, on the genital and urinary organs and on the legs, and can be used without hesitation for all subjects over 16. It is no more dangerous than inhalation anesthesia, while it does not change the parts like the infiltration technic. It will be found a most valuable substitute for general narcosis for debilitated and elderly subjects. The only proviso is that no drug so toxic as cocain should be used. From 1 to 2 c.c. of a 3 per cent. solution of beta eucain in distilled water were injected into the dural sac after from 3 to 5 c.c. of the cerebrospinal fluid had been allowed to escape. The analgesia lasted from twenty-five minutes to an hour and forty minutes. It was so complete in 170 cases that there was no sensation except that of pressure during the incisions and traction on the soft parts and nerves. No by-effects were observed in 79.5 per cent. of the subjects. When the operation was undertaken in silence without asking the subject if he felt nauseated, etc., it proceeded without disturbances, or if any occurred they were slight and transient. The toxic symptoms indicated bulbar irritation, and in 5 cases there was dyspnea, dilatation of the pupils, cold sweat and small pulse, with tremor of the muscles in 2. A few drops of chloroform soon dispelled these phenomena. They occurred exclusively in persons under 16 or in hard drinkers. The recovery was so rapid that the operation did not have to be interrupted. The article concludes with the statement that the greater the experience with spinal analgesia the more unconditional the appreciation.

98. **Vaccination Under Red Light.**—Rösler refers to Goldmann's recent communication in regard to the favorable result of vaccination under red light. He then reports still more favorable experiences with the red light. A group of 250 soldiers were vaccinated as usual by daylight. The spot was then dressed with four layers of gauze dyed red with cochineal, covered with a protecting shield of red gelatin, and the whole fastened with a single thickness of cotton also dyed red. Another group of 42 men were vaccinated and the spot was protected with the same shields and outer dressing without the gauze inside. Another group of about 250 men were vaccinated at the same time and no dressings applied. The results demonstrate in his opinion that the pustule runs a typical course under the red light, but that it is much milder than usual and all complications are avoided. He was encouraged by the results observed to treat two severe horse bites on the arm by exposure to red light. A red gelatin shield was placed over the wound and left exposed when the arm was dressed. The patients lay in beds near a window, the red window in their dressings turned to the light and exposed to direct sunlight for an hour daily. The wounds healed remarkably quickly. It seemed as if the red light checked the growth and activity of pyogenic cocci.

Gazzetta degli Ospedali, Milan.

Last indexed page 1829.

99 (XXV, No. 112.) •Simpatectomie utero-ovariche. G. Foschini.
100 Cisti dermoide. G. Cavazzani.
101 Sul meccanismo della infiammazione. A. Curci.
102 Tachiolo nella otite media purulenta cronica (silver fluorid). De Simoni.
103 (No. 115.) Sulle polinevriti. De Renzi. Clinical lecture.
104 Intorno a 275 ernie inguinali curate coi processi del Bassini, del Postempski e del Mugnai. G. Barbranti.
105 (No. 118.) Intorno al valore diagnostico della tubercolina. C. Mastri.
106 Catgut Claudius. F. Fabris.
107 La cura iodica nell' infezione carbonchiosa (in anthrax). G. Li Destri.
108 (No. 121.) La terapia specifica della tuberculosi e la sua vaccinazione. E. Maragliano. See page 971, vol. xlii.
109 Rinite fetida da bacillo piogene fetido. A. De Simoni.
110 •Contributo alla cura dell' epilessia per mezzo delle iniezioni di estratto oleoso di sostanza cerebrale (Cefalopina). P. Soleri.
111 (No. 124.) L'emoantitossina nella cura della tubercolosi polmonare. G. Niccolini.
112 Tubercolosi reumatica. A. Banelletti.
113 (No. 127.) La percussione uni-digitale. E. Caccianiga.
114 La malattia di Dercum. G. Migliacci.
115 Intorno a 2 scimmie tubercolose (monkeys). Marzagalli and Figari.
116 La sieroterapia nella cura delle adenopatie tubercolari. G. Ricci.
117 La spondilite infettiva. L. Fracassini.
118 (No. 130.) Fevers of Unknown Origin.—Sulle febbri di origine nascosta. C. Bozzolo. See page 1731.
119 Intervento chirurgico nell' ulcera rotonda dello stomaco e nel pilorospasmo. D. Maragliano.
120 Perniciosa tifosa.—Contributo allo studio dell fagocitismo nell' infezione malarica. B. Ferruccio.
121 Spondilosi Rizomelica. A. Curcio.

99. **Utero-Ovarian Sympathectomy.**—Ruggi attributes to the pelvic plexus many of the disturbances in the gynecologic sphere, trophic, motor and sensory. This plexus transmits the peripheral stimuli to the brain, and if this transmission can be interrupted, then the severe pains in many instances can be abolished. Partial resection of the pelvic plexus is indicated, in his opinion, when severe pains persist after surgical intervention has proved ineffectual to cure, or the organs are apparently entirely or nearly sound. Up to 1900 he had performed this operation, on one or both sides, on 9 women who had previously submitted to various mutilating gynecologic operations without relief from their severe pains in the pelvic viscera. Cavazzani has also performed the operation five times, and Foschini here reports 3 additional cases. The results in every instance have been the permanent relief of patients from their sufferings, as, he remarks, was to be expected from the anatomy, physiology and pathology of the parts. In his 3 patients a constant symptom was the exacerbation of the pain when the abdomen was palpated along the psoas muscle. In one other case on record the pain here was spontaneous and severe. He is convinced that this operation of sympathectomy should supplant ovariectomy in many cases in which the latter is supposed to be indicated. Experimental research has rendered it probable that the genital function is gradually lost after bilateral resection of the pelvic plexus, but the pain—which frequently persists after ovariectomy—is cured, and the patient is spared useless mutilation of organs. His patients were 18, 25 and 44 years old. The first patient presented pelvic neuralgia, the viscera normal. The second—a hysteric epileptic—had been treated by ovariectomy and later by hysterectomy, but the pains persisted until relief was obtained by bilateral resection of the plexus. Examination was negative in the third patient, but the attacks of pain in the pelvis recurred with progressive intensity, and were completely conquered by bilateral resection of the plexus.

110. **Treatment of Epilepsy with Brain Substance.**—Soleri has been using in 7 cases of epilepsy and in a larger number of neurasthenics an oily extract of brain substance (cephalopin), as a therapeutic measure. He found that it had an unmistakable and effectual action in reducing the nervous excitability, even after failure of other extracts of brain substance. There were never any symptoms of intolerance; all the patients felt better and increased in weight. He injected from 1 to 2 or even 5 c.c. every second day, for nearly two months. The extract is prepared with oil; it is stable and free from albumin to coagulate while it contains a large proportion of lecithin. It is prepared at Maragliano's Institute for Infectious Diseases at Genoa, and is standardized with 1,000 anticonvulsion units per c.c.